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JULY 1961

THE PAPER INDUSTRY

- Coating additives
- Albany Felt round table discussion
- Polysulfide pulping
- Use of colorants in papermaking

Publishers of PAPER AND PULP MILL CATALOGUE

The secret that couldn't be kept!

When the Johnson Rotary Syphon was ready to go, it was our intention to keep it under wraps for a while . . . until it had been thoroughly field-tested; until we had licked all installation problems; until we had a reasonable inventory on hand.

But good news has a way of getting around, and the clamor for test installations began almost before the patterns were finished. Today Johnson Rotary Syphons are operating in more than 50 mills. Many of these have already embarked on programs of complete conversion.

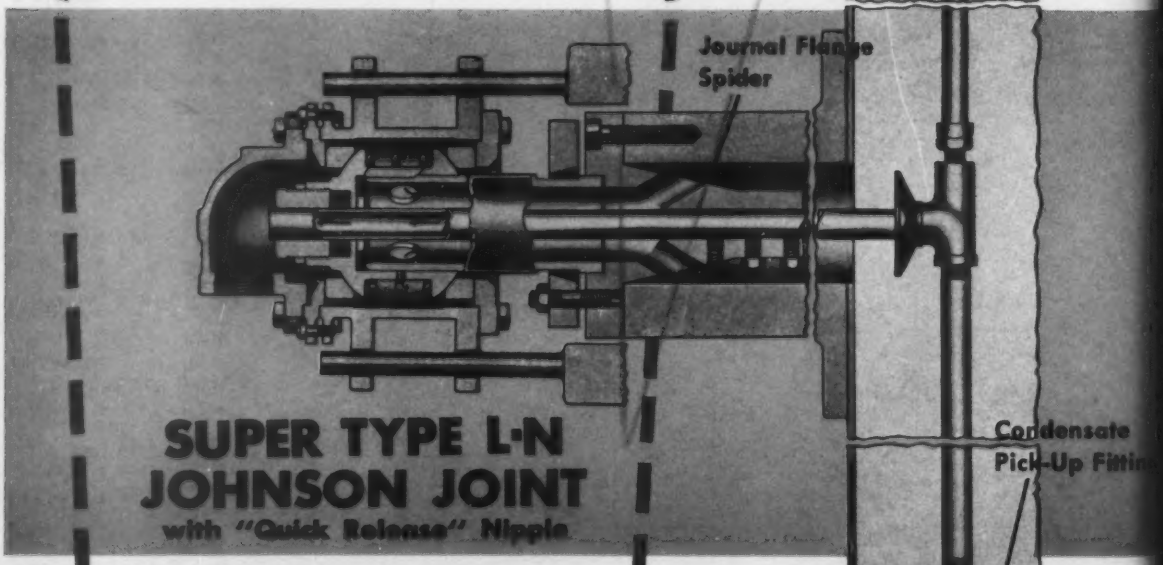
It is no longer a secret that the Johnson Rotary Syphon represents an important breakthrough in draining condensate from dryer rolls of paper machines. A new concept of pick-up design holds condensate film to a minimum, for optimum transfer of heat units to dryer shell. Better drainage helps reduce horsepower demand; eases bearing wear caused by prolonged "cascading"; cuts maintenance all along the line.

Ease of installation is a welcome feature. The Johnson Rotary Syphon can be inserted right through the manhole; there's no need to get inside, no internal drilling or tapping. There's even a journal-inserted syphon for dryers with handholes only. The Rotary Syphon can be installed anywhere along the face of the dryer shell.

As a logical sequel to the Johnson Rotary Pressure Joint, this new Rotary Syphon completes the task of getting steam in and condensate out of dryer rolls and squeezing maximum effect out of the heat units contained. One secret remains for you to discover: just how much it can improve production and cut costs in your mill!

For engineering data — with the full story of research, design and construction ask for copy of "Condensate Behavior in Paper Machines"

The *New* JOHNSON ROTARY SYPHON



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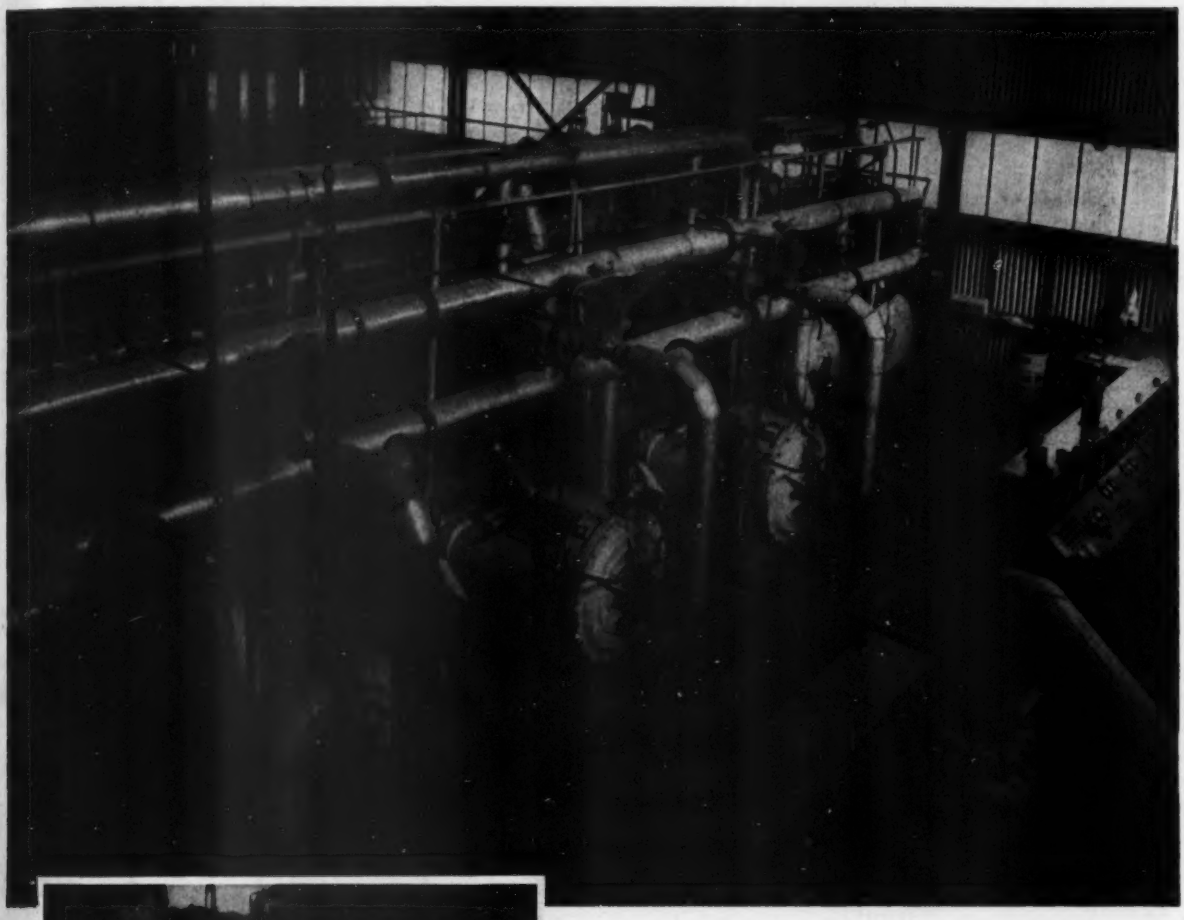

After two years of tough work Jones Double-D Super-Stainless discs show only .065" wear — evenly distributed and with parallelism perfectly retained.

for Jones Double-D's on the Seminole Chief

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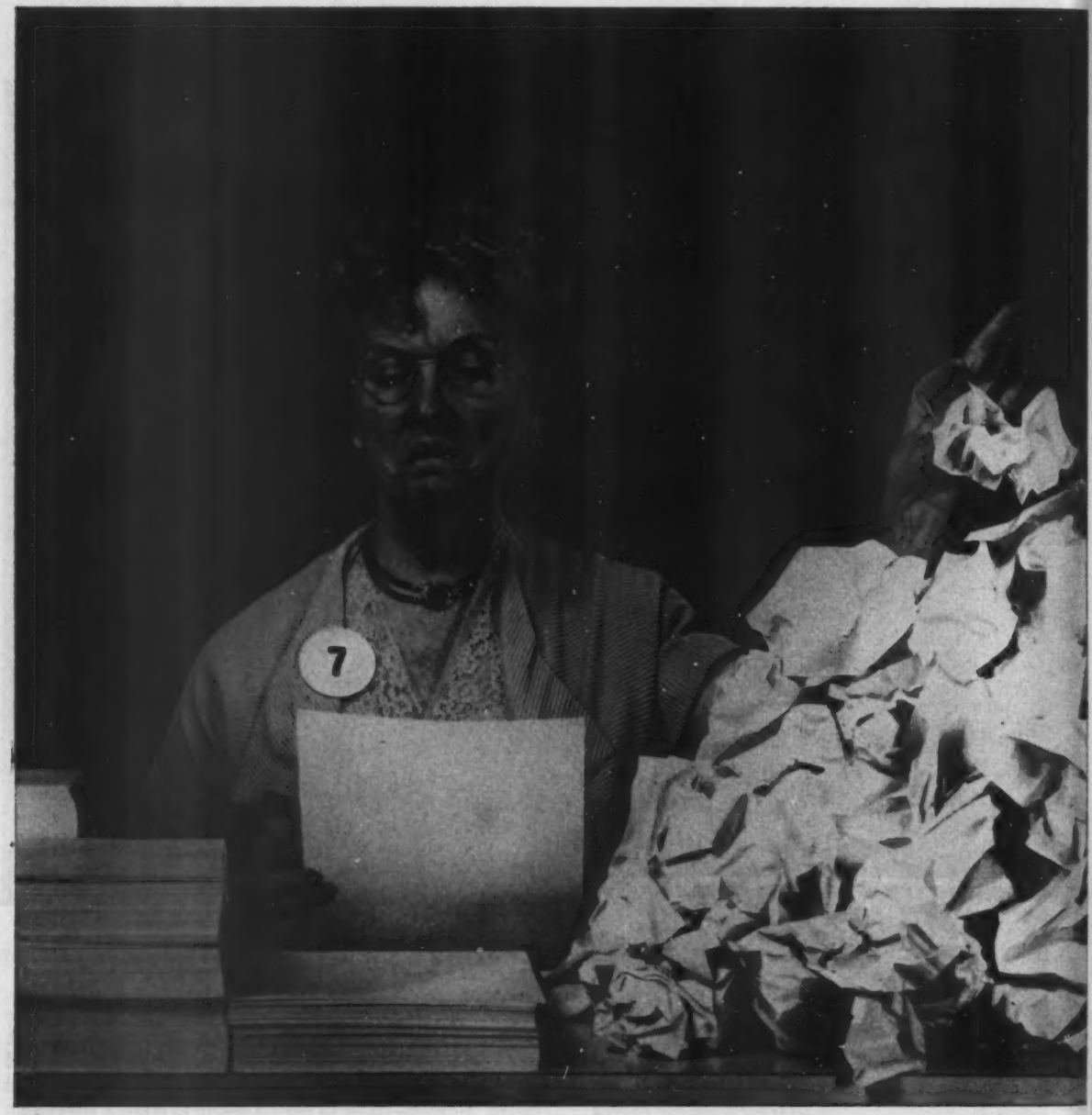

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contents

FEATURES

217 Editorial: Beloit strengthens its research facilities

284 Whither?: Export trends — new heat source produces temperatures of 3000° to 6000° F — A chemical to reactivate DDT — Denser paperboard for corrugated containers — Chemical treatment of trees "on the stump" — Nicolet Paper coats aluminum on glassine

225 Rheology of paper coatings: Part VI — Coating additives — *R. A. Diehm*

229 Use of colorants in modern papermaking — *Joseph W. Dragonetti*

233 Polysulfide pulping — *I. W. Scopp*

236 Fine paper suction transfer machine operation discussed at Albany Felt round table

239 PIMA holds 42nd Annual Conference

240 Estimation of fiber length index — *D. S. Davis*

256 Industry officials tour Tennessee River's new kraft mill

NEWS

253 Industry news

253 Productivity team to tour countries

253 Spruce bark — a source of new materials

254 Corporation changes

254 Recent expansions

259 Names in the news

282 Necrology

DEPARTMENTS

223 Mind your own business

247 Current comments

258 Coming events

263 Foreign abstracts

267 Patent reviews

269 New products

277 New literature

281 Market quotations

283 Index to advertisers

FRONT COVER — A dye solution being measured for mixing in the Sandoz Paper Laboratory (See page 229).

Another Mount Vernon Dryer Felt Success Story . . .
A paper producer wanted for a bottom position, a felt which would stand 35 pounds of steam, run 600 feet per minute, give efficient drying, and yield a low cost per ton. Mount Vernon's WOODBERRY SUPER 887 was recommended. This felt ran a total of nine months giving a cost of 2.5 cents a ton. The special combination of cotton, asbestos and synthetic yarns in Mount Vernon's WOODBERRY SUPER 887, designed to increase efficiency at a great savings, chalked up another fine performance!
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887

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WOODBERRY SUPER 887–Asbestos and Synthetic Reinforced Dryer Felt

This smooth-faced dryer felt of asbestos and synthetic fiber reinforcement has the ability to run in hot spots where full-faced asbestos felts are currently being used. Since WOODBERRY SUPER 887 is substantially lower in cost, this felt presents a great potential for saving, for producing paper at much less dryer felt cost per ton. Developed to serve a wide variety of paper-making applications, versatile, economical, WOODBERRY SUPER 887 has earned its standing of great popularity among leading paper producers.

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from our point of view

Beloit strengthens its research facilities

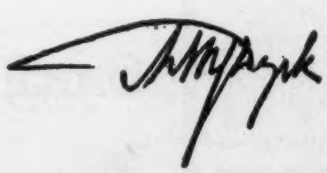
It was apparent to everyone attending the opening ceremonies of Beloit's new Research Center that Harry Moore, president of Beloit Iron Works, and his staff have succeeded in translating their best talents into the creation of research facilities which are second to none in the pulp and paper field and which are destined to serve as Beloit's greatest asset for many years to come.

The opening of the Research Center was ideally timed to come at the conclusion of the Executives' Conference held at the Institute of Paper Chemistry which helped to familiarize the assembled paper makers with an exceptionally thorough research program implemented by the Institute, leaving no doubt about the all-importance of the role of research in pulp and paper making.

The Beloit Research Center seems complete to the last detail. To mention some of the unique equipment installed at the Center, two pilot plant paper machines will be available for operation in parallel to simulate all production phases of any commercially operating paper machine. One of the machines will have provisions for sheet formation on the wire, the other on the Rotoformer, with drying accomplished on either cylinders or with air-caps. A pilot plant coating unit is designed to study most coating problems facing the paper industry. A special instrument, developed by Beloit, permits visual observation as well as recording on film of fiber-movement and flocculation in suspension. Another piece of equipment, also of Beloit design, is the unique micro-wave moisture meter which measures the moisture content in the sheet by making use of an energy frequency of 22,235 Mc/s which corresponds to the frequency of the rotational energy of the water molecule. The Center also has excellent facilities for investigating problems in heat transfer, fluid mechanics, papermaking processes, instrumentation, machine design, stress analysis, materials of construction, etc.

There are many problems in the pulp and paper industry which are in urgent need of solution. The solution of these problems will be accomplished through diligent research in university, government, and industrial research laboratories. Since the pulp and paper industry currently spends only 0.5 per cent of its sales dollar on research, compared to the national average of 1 per cent, there is much "room at the top" for this kind of endeavor in our industry.

We take great pleasure in complimenting Harry Moore and his engineering staff on the completion of their new research facilities dedicated to the solution of many vital problems in pulp and paper making. It is this kind of effort that is needed to keep the pulp and paper industry moving and competitive, raise production efficiencies, spark new product development, and contribute in large measure to the growth of the national economy.



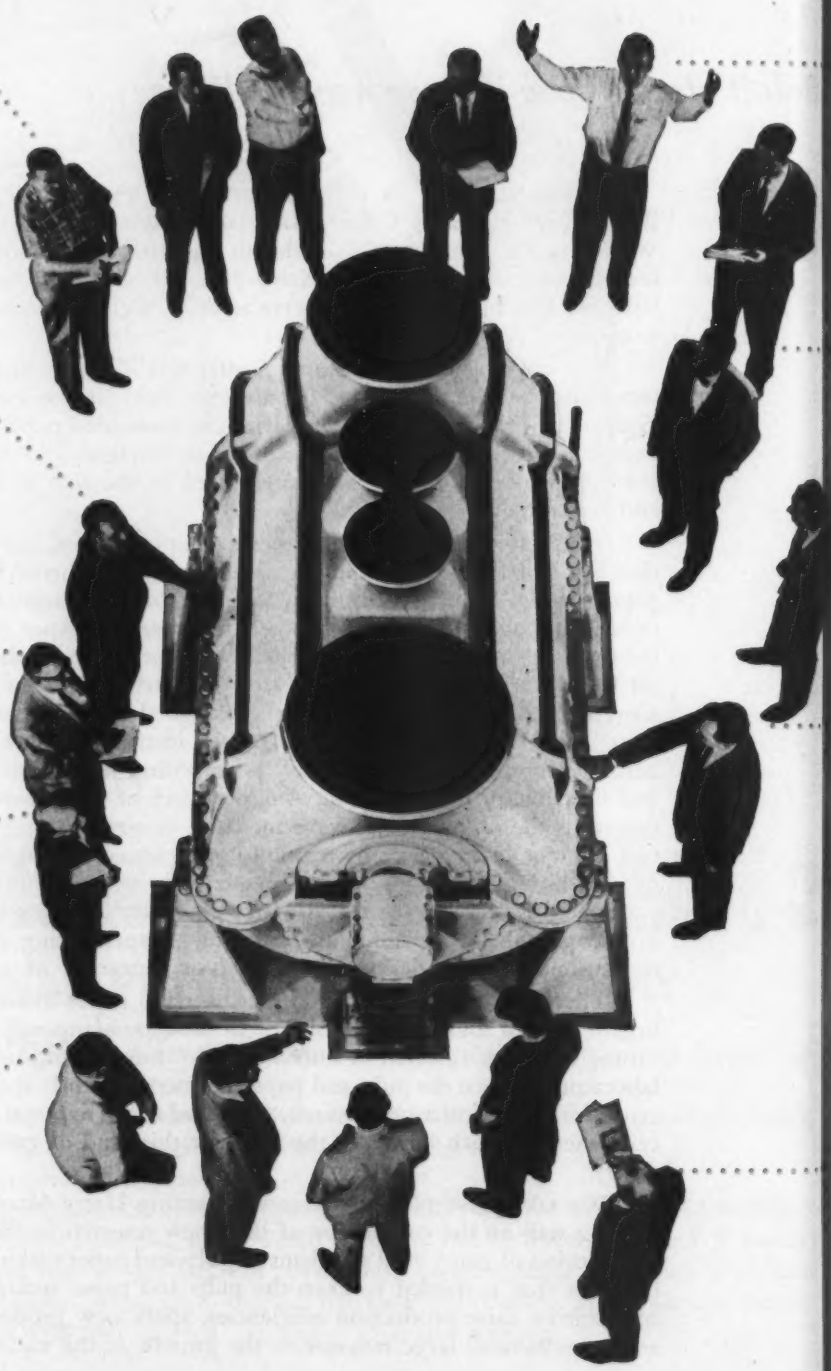
It's the first of its kind ever built in America

It saves up to 25% on horsepower

And 70 to 90% of its power is recovered as hot air for drying

It has reserve capacity, too— no more vacuum pumps to add

Horsepower used is proportional to the actual vacuum capacity you need



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Automatic control provides vacuum and capacity as required

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This first unit, shipped in May, provides a total capacity of more than 36,500 cfm at vacuums of 10″, 15″ and 20″ Hg. Requiring 1,065 bhp, it will do the work that would require 6 individual wet vacuum pumps totaling 1,285 hp, with plenty of reserve capacity to handle extra loads for higher paper machine speeds and changing basis weights. Net saving, 220 hp! Two additional I-R vacuum systems are now being built for two other paper mills.

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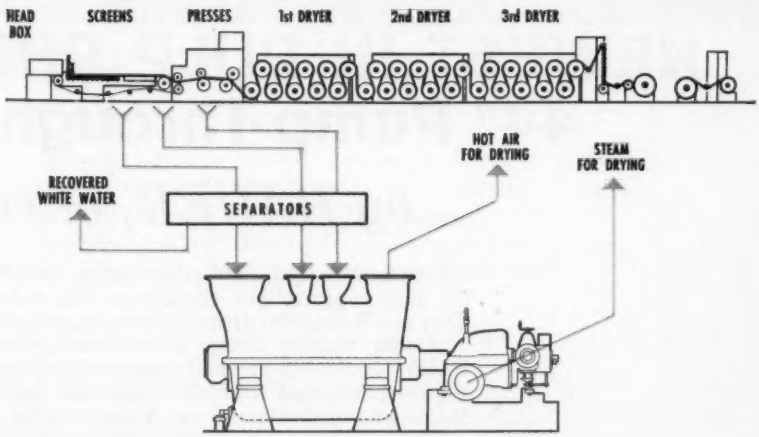

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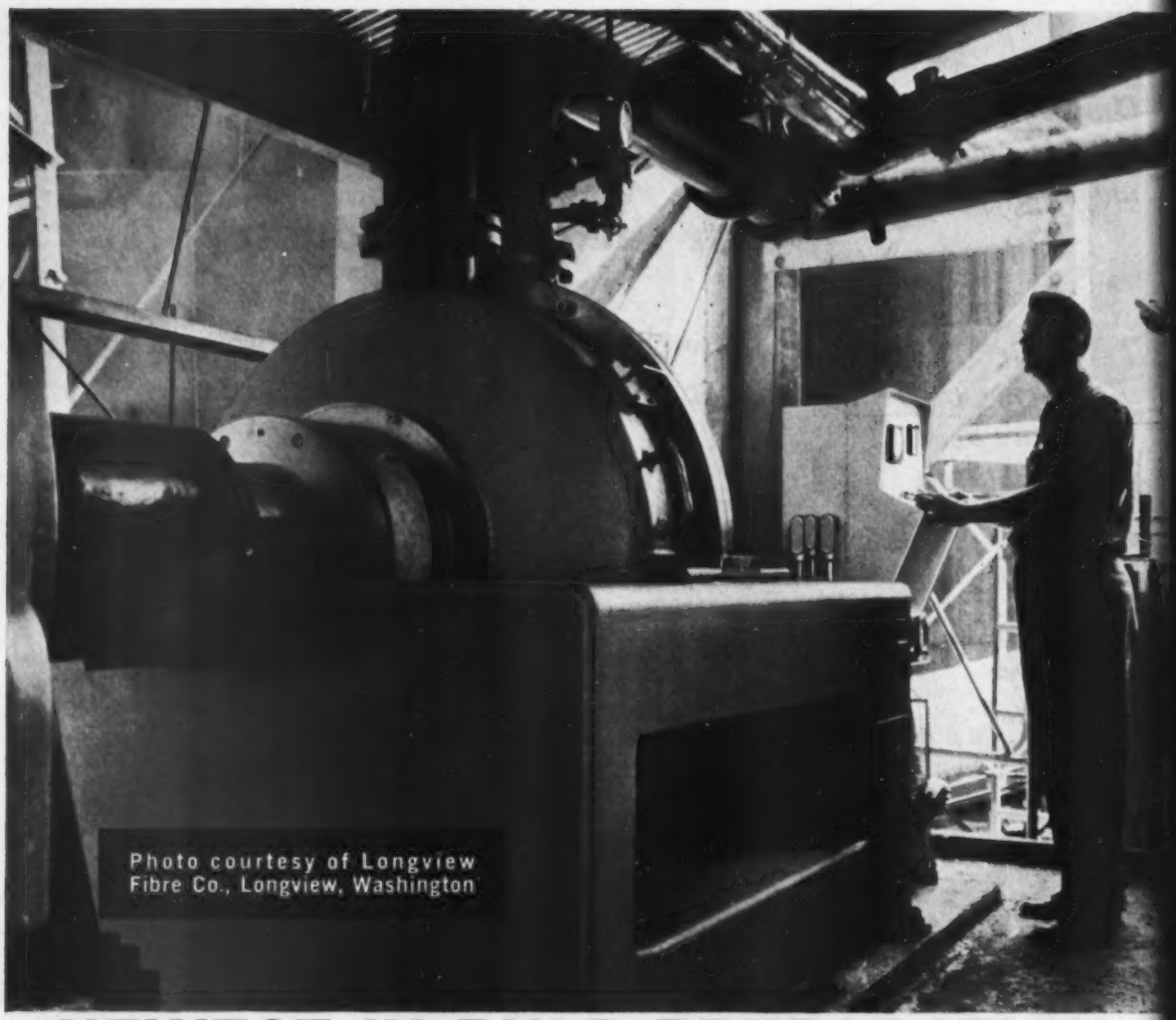

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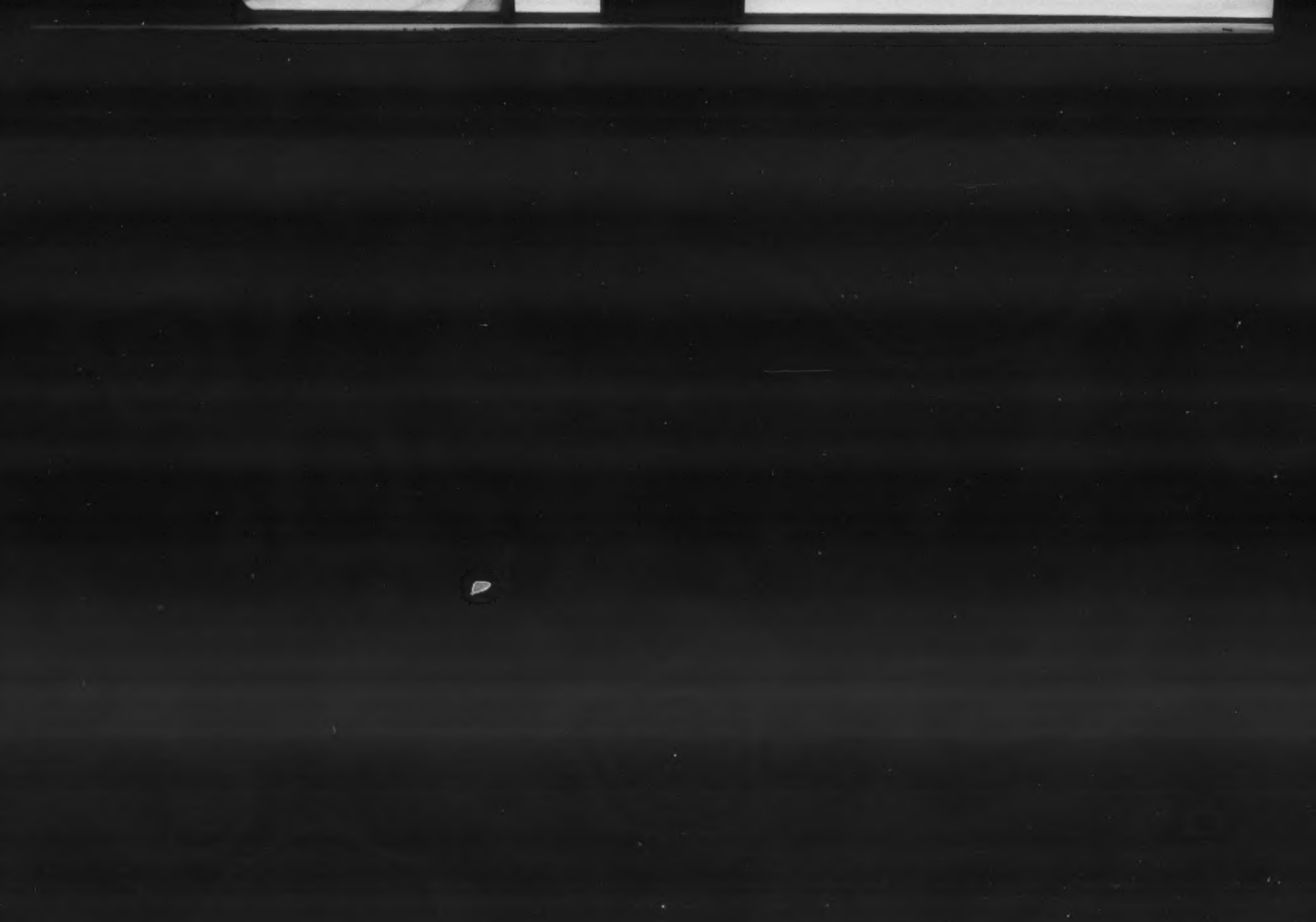
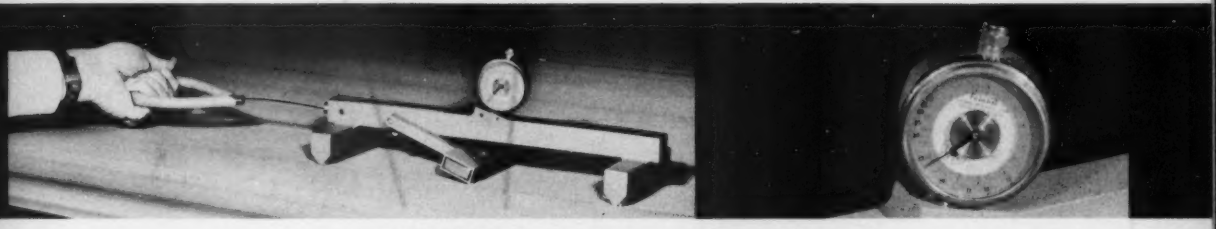


Take a number...



. . . a HUYCKMETER number that is.

When you do, you are on the way to cutting your costs per ton.

The Huyckmeter is the only portable tension instrument available to the papermaking industry. Its purpose is to put a number (pounds per linear inch) on running felt tension. With the Huyckmeter, the best tension level for maximum performance and life can be maintained felt after felt. ***You may now purchase the Huyckmeter for your own paper mill.***

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Ted Pollock

How to test an idea for clarity

Before you can put an idea across to others effectively, it's essential that it be diamond sharp in your own mind. Basic stuff? Maybe. But you'd be surprised how many people start talking before their idea has crystallized in their own minds. They mistake the fuzzy outlines of a thought for an idea and the fuzziness becomes apparent as soon as they try to verbalize it.

On the other hand, once you understand precisely what you want to say, in nine cases out of ten you have little difficulty finding the appropriate words to describe it. Few of us lack the actual vocabulary with which to express our thoughts. Our real problem is to pull the things in our minds into focus and see them sharply so that we may choose the proper "word-symbols" for them.

Fortunately, there is a sure-fire test for clarity. It's so simple that many people completely overlook it.

It's just this: write it out.

There isn't an idea in the world that can't be expressed on paper. Conversely, if it can't be put down on paper, it isn't a fully developed idea. The mere act of writing compels you to get the things in your mind into focus and find the right word-symbols for them. It literally forces you to be clear.

For more efficient reading

Is keeping up with the literature in your field getting you down? Does there seem to be just too much to read? A helpful technique is *skimming*, the skill that gives an "airplane view" of the printed page.

Try reading the first sentence only of each paragraph. Drive yourself through a chapter in a book or an article in a magazine, reading only the first sentence of each paragraph. Before long, you will be aware that this procedure makes sense, that the thought is flowing smoothly and progressively. If the first sentence doesn't make sense, try the last sentence of the paragraph. When you have finished, you will be aware of two things. First, you will have an over-all view of the entire selection. Second, you will be aware of having read thoughts, not just words.

Occasionally, you will find a writer with whom this method of skimming doesn't seem to work. Such writers are the more difficult ones to read. They hide the "key" sentence in the middle of paragraphs. But writers usually follow a consistent pattern of thought development and once you crack one or two paragraphs and understand how the author works, all the others will probably show a similarity of structure and plan.

If, after skimming, you decide that you want to read with more thoroughness, you can still save time by re-reading the entire piece "telegraphically". That is, look for the words within the paragraph that express ideas without adding unnecessary detail. For example, read the following:

> Reading is an extremely complex psychological process. Marked reading retardation should have the best advice of a reading specialist. The quickest way for anyone to improve his reading efficiency is to seek the help of a reading center, such as are to be found at many leading universities.

How many words did you read? There are 48 words in that selection and, unless you are a skillful reader, you probably read all 48 of them. Here, however, is what you should have read:

> Reading complex process. Retardation should have advice of specialist. Quickest way to improve efficiency is seek help of reading center Found at leading universities.

You have lost nothing of the thought, but you have reduced your reading load by exactly 50 per cent!

Conquer on-the-job tension with on-the-job exercise

Desk-bound and push-button pampered, we can't always get the exercise we know we need to reduce tension, feel better, work at maximum efficiency. Yet, there are many little exercises that you can perform on-the-job and throughout the day which need not interfere with your routine and which can be almost as beneficial as a trip to the gym. Try these:

- In the morning, park your car or get off your bus four or five blocks from work. Briskly walk the rest of the way.
- In your office building (or anyone else's) get off the elevator a floor before your destination, walk up the last flight.
- Use odd moments during the day to do a few semipush-ups—lean on your desk at a 45° angle, then push yourself up straight. Or, try several deep knee bends.
- Tension builds up in the neck and shoulders. So, whenever you've been working in one position for any length of time (at your desk, for example), sit back in your chair and shrug your shoulders several times. A few old-fashioned stretches can be a tonic, too.
- Set aside part of your lunch hour for a walk. Even 10 min. so spent can help work off "tension build-up".
- Don't take the elevator down at the end of your day. Use the stairs.

No coating is any more durable than the adhesive that holds it together and binds it to the paper. CLINTON starches and dextrins make sure that your coated stock has a uniform finish free from "skips." Used as a clay coating or as a size, CLINEO starches add a high degree of strength and gloss printing quality to gloss surfaces. CLINCAL starches — containing their own lubricants — improve printability and control curl. Both starches are available in many varieties. For quality that makes a lasting impression on customers and prospects, use CLINTON coating starches.

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FEATURE ARTICLES

RHEOLOGY OF PAPER COATINGS

R. A. DIEHM
Professor of Paper Technology
Western Michigan University

Part VI – Coating additives

THE earliest coating mixtures used on a large scale employed protein adhesives. When the first attempts were made to use other adhesives, the coating technologist observed that the flow characteristics changed with the substitution of the other adhesives. The search for substances which would help retain the original protein flow characteristics when non-protein adhesives were used, initiated the use of auxiliary materials in the coating mixture along with the pigment, the dispersing phase, and the adhesive.

The development of different coating methods gave further impetus to the use of auxiliary materials in order to put a coating layer onto the surface of the paper that is uniform in thickness with a minium of pattern on the surface. These substances have been termed "additives" and are enjoying widespread use in the paper coating industry today.

Today additives are considered basic ingredients in the coating mixtures because of their universal use in altering the flow and end use characteristics of the coating mixtures to do just the right job. Among additives must be listed the waxes for water resistance and finish, lubricants for mechanical handling, plasticizers, soaps, fluidifiers, thickeners, preservatives, foam killers, etc.

Viscosity-decreasing additives

Probably the most important additives used today are those which help to control, lower, and stabilize the viscosity of adhesives and to modify the flow characteristics of the coating mixtures. Starch is the most widely used adhesive in the coating industry, and many studies have been made on the flow modification of coating mixtures in which it is used.

It has been known for some time that urea mixed with starch is effective in preventing or retarding the retrogration of starch solution. One would expect, therefore, that it would modify the flow characteristics of the coating mixtures containing starch adhesives.

Urea

The high solubility of urea in water makes it possible to use it in systems of high solids content. It lowers the initial viscosities of starch, casein, and alpha protein dispersions (1). The effect upon starch pertains to those starch products in which the starch molecule has been modified. If the thixotropic index is taken as the viscosity at low shear divided by the viscosity at high shear, then the lowering of viscosity in starch dispersions results in the lowering of the thixotropic index.

The stability index (1) of starch dispersions has been indicated by dividing the viscosity of the starch dispersion after aging by its viscosity immediately after cooking. Urea was effective in lowering the rate of viscosity increase in starch dispersions upon aging. The addition of 5 per cent urea to a 30 per cent corn dextrin before cooking decreased the viscosity from 102 centipoises to 70 centipoises in several hours after cooling. When these dispersions were allowed to stand for 198 hrs., the dispersion without urea showed a viscosity of 17,520 centipoises while the one containing 5 per cent urea had a viscosity of 6,160 centipoises. The stability index of starch dispersions was improved in all cases when urea was used.

A unique effect of urea has been in decreasing the amount of enzyme required to convert starch. Urea also decreases the viscosity of enzyme converted starches. When using urea in the enzyme converted starches after heating to inactivate the enzyme, the negative heat of solution of the urea reduces the cooling time of the starch dispersion in its preparation for use in coating mixtures.

The addition of urea of casein dispersions makes it possible to increase the solids to some extent without increasing its viscosity. Casein cut with borax or triethanolamine responded better to urea

treatment than did those cut with soda ash or ammonium hydroxide.

Relatively small amounts of urea resulted in a marked reduction of viscosity in both starch and protein dispersions. The high solubility of urea permits the use of larger quantities of it when greater reductions of viscosity are sought or when it is to function as a plasticizer.

Dicyandiamide

Cyanoguanidine or dicyandiamide is somewhat similar (2) to urea and is also an effective modifier for starch dispersions. While it is primarily regarded as an additive to starch, it will reduce the viscosity of and stabilize a number of protein dispersions. It is amphoteric in nature, but not as soluble as is urea. The limits of solubility are approximately 20 per cent in hot water and 3.5 per cent in cold water. It also has the effect of retarding the growth of some microorganisms in adhesive dispersions.

The action of dicyandiamide in starch dispersions is primarily to lower the initial viscosity and to maintain it in lower viscosity ranges for rather long periods of time by preventing premature gelling (3). The useful working life of such dispersions is prolonged by doing this. It is used in quantities ranging from 0.5 to 25 per cent on the weight of the starch, and is preferably added as the dry powder to the water dispersion before cooking. The nature of the starch product has some influence upon the time of addition. Enzyme converted starches, for example, respond very well to dicyandiamide after the enzyme has been inactivated. As in the case of urea, dicyandiamide does not reduce the viscosity of unmodified starches, but reduces the gelatinization temperature.

A direct comparison of dicyandiamide and urea is of interest because of their chemical similarities. The former is more effective than the latter in reducing the viscosities of some starch dispersions in low solids. In high solids, however, urea is the more effective because of its higher solubility; under such conditions, dicyandiamide may crystallize and lose its effectiveness. If conditions in the system are of such nature as to allow the urea to hydrolyze into ammonia and carbon dioxide, the alkalinity of the starch dispersion may increase and cause the viscosity to decrease. Since both substances decrease the initial viscosity of the cooked starch, the possibility of using less degraded starches arises so as to strengthen the final adhesive bond. Urea is hygroscopic while dicyandiamide is not, and this property must be taken into consideration in their use to modify coating mixture properties.

It has been reported (3) that dicyandiamide reduces the viscosity of casein dispersions without affecting the desirable properties of casein. The thinning action of dicyandiamide on casein-clay coatings is similar to that on starch-clay coatings. The greatest effects appear to be in the high solids range. The dicyandiamide is cooked with the casein. It is further claimed (3) that casein coatings modified with dicyandiamide do not stick as readily on paper machine dryers as do those which are not so treated.

Esterified ethers of fatty acids

The influence of esterified ethers of fatty acids (4) is quite different for the different starches. The following table shows how this additive has different effects upon corn, tapioca, and potato starch dispersions:

Additive	Corn Starch	Tapioca Starch	Potato Starch
	cps	cps	cps
None	4400	2700	2000
0.25%	2350	7500	—
0.50%	320	4600	5700
1.00%	50	50	7000

The viscosity drop in the case of the corn starch dispersion follows the desired curve expected from effective additives. In the case of the potato starch disprsion the esterified ethers of fatty acids caused an increase of viscosity while in the tapioca starch dispersions there was first an increase followed by a very marked decrease in viscosity.

Latices

An extensive study has been made (5) on the use of latices alone and in combination with other additives in influencing the flow characteristics of coating mixtures. It deserves close examination when the matter of additives is under consideration because of the growing importance of latices in coating mixtures.

The replacement of 25 per cent of a medium viscosity oxidized starch by latex in coating mixtures with an without a soap additive gave only a slight reduction in its viscosity with plastic-thixotropic flow characteristics. When the latex replaced 50 per cent of the starch, there was a signigicant decrease in viscosity with or without the soap additive. This permitted the elevation of the total solids in the coating mixture and still retain the viscosity of the original coating mixture of lower solids with starch as the sole adhesive. It must be recognized here that the latex not only dropped the viscosity of permitted higher solids in the coating mixture, but it also added to the strength of the adhesive.

Sodium sesquisilicate

It is quite general knowledge that sodium sesquisilicate is a powerful additive for reducing the viscosity of protein dispersions. It should not be used indiscriminately because under some conditions its high alkalinity will cause the viscosity to drop very markedly. This usually decreases the adhesive strength of the proteins.

When 12.5 per cent sodium sesquisilicate were added on the total adhesive solids, the replacement of 25 per cent of the sodium hydroxide cut casein with synthetic latex made it possible to increase the solids 3 to 5 per cent without increasing the viscosity. As the replacement of casein was advanced to 50 per cent, a greater increase in solids was possible. The addition of the sesquisilicate changed the flow properties of the coatings from pseudoplastic-thixotropic to plastic-thixotropic.

The above results are quite indicative with others when sodium sesquisilicate was used with ammonia cut casein as well as with soya bean protein cut with sodium hydroxide or ammonium hydroxide. While there were some minor variations in solids improvement, the important matter is that in all cases the flow characteristics were changed from pseudoplastic-thixotropic to plastic-thixotropic.

There are a number of other additives which are used to modify the viscosity and flow characteristics of coating mixtures. Nothing further can be reported on them because the manufacturers have not disclosed the nature of the products and they cannot be discussed technically without such knowledge.

Amines

The flow characteristics of the coating mixtures can also be changed by the use of additives

which influence the pigments. The ones under consideration here are those which act independently of but along with the commonly used dispersing agents. An excellent study on the use of amines has been reported (6) recently, The amines under consideration in this work were ethylenediamine, diethylenetriamine, triethylenetetramine, tetraethylenepentamine and triethylenediamine.

These amines apparently are effective in changing the flow properties of coating mixtures by forming a linkage between clay particles. The shape and size of pigment particles have profound effects upon the rheological properties of pigment dispersions. Clays which exhibit a large diameter to thickness ratio develop a greater degree of dilatancy than do those with a smaller diameter to thickness ratio when both are handled under the same conditions. This effect appears to be due to a chemical reaction rather than an influence upon the particle size or shape.

It has been epostulated (6) that there might be a correlation between the action of the positive aluminum ions in bonding clay particles to cellulose and the positive amines in bonding clay particles to clay particles. It has been found that at any given pH, the shorter the chain length of the amine, the more effective it will be in altering the rheological properties of the system.

Starch coating mixtures at 50 per cent solids treated with amines do not show any of the dilatant characteristics so often associated with clay dispersions, but actually show higher yield values and increased thixotropy than do those not treated with amines. There is some increase in viscosity when the system undergoes such changes.

The influence of amines upon the areal ratio of the coating mixture poses some very interesting applications. This ratio is the relationship of the areas covered by a given amount of coating mixture when spread by steel and raw stock coated rolls. The lower the areal ratio the longer the time available for the pigment particles in the coating to orient themselves. Increasing the solids of the coating mixture reduces the areal ratio. Lightweight coatings with low areal ratios have been shown to provide coated surfaces of smoother printing surfaces than similar coatings with high areal ratios. Amines lowered the areal ratios in all the coating mixtures studied. In addition to their effect in helping form a smoother printing surface, they also help the ink receptivity of the surface because amine treatment of the clay tends to make it more organophilic.

Viscosity-increasing additives

The additives considered thus far have been concerned with viscosity reductions to increase the solids of the coating mixtures. The increased use of emulsions, dispersions, and latices in higher percentages of the total adhesive or even as the sole adhesive material have presented the problem of the preparation of coating mixtures in which the viscosity is too low to function properly on the coating machine. While the viscosity of the formulation must be low enough to permit convenient handling, it must be high enough to prevent separation of the mixture components in the vat and on the surface of the paper, puddling on the paper, and dripping unduly on the application machinery. If the best possible use is to be made of the coating formulation, the viscosity must be in a rather definite range.

These factors are pertinent (7) regardless of whether polymer solutions or dispersions are used. Many dispersions used today are characterized by high solids and low viscosities. The addition of solid materials to such dispersions may alter them but slightly or very markedly, depending upon the state and character of the solid material.

The viscosity of a polymer solution increases rapidly as the molecular weight becomes greater or as the concentration rises. The viscosity of a polymer dispersion is low, being unaffected by the molecular weight of the material in question. Since the rheological deficiencies of the dispersions lie in too low viscosity and those of the solutions in that the viscosity is too high, combinations of dispersions and water soluble polymers can be used to adjust the rheological properties to the desired range.

A number of water soluble, high molecular weight natural and synthetic polymers are used daily to adjust the viscosity of latex dispersions, their effectiveness being judged on the amount of the polymer required to make the required change in viscosity. At present, nonionic and anionic polymers are used almost exclusively since cationic polymers have not been prepared for this purpose. The materials used for this purpose comprise sodium carboxymethyl cellulose, sodium and ammonium alginate, gum karaya, methyl cellulose, hydroxyethyl cellulose, casein, soya protein, gelatin, sodium and ammonium polyacrylate and polymer, and alkali soluble emulsions. Compatibility limitations must be observed since polyelectrolytes of a charge opposite to that of the latex will precipitate the latex from dispersion.

There is no best method of using the thickener because each has its own peculiarities to take into consideration. It must be that in any method of addition, the local concentration of the thickener is high before homogeneity can be achieved by mixing. There may be some destabilization of the dispersion because many of the high molecular weight polymers may act as flocculating agents even in cases where the stabilizing charges are not neutralized. A very gradual addition of the thickener under good agitation may avoid flocculation. If it occurs, redispersion may be effected by prolonged agitation, but the system is never as good after flocculation and redispersion as it would have been had this not occurred. The amount of thickener and the pH of the dispersion and thickener are extremely important.

The addition of an aqueous solution or dispersion tends to lower the viscosity because of the water added and to increase the viscosity because of the polymer. It is the resultant of these actions that determines the final viscosity of the latex. This final action may be rather complex as will be seen as the mechanism of thickening is considered in more detail.

Low molecular weight polyelectrolytes may serve as deffocculating agents, lowering the viscosity. High molecular weight polyelectrolytes may serve as creaming agents in low concentration or as thickeners in high concentration. Thus the thickening of a latex may be a thickening of the aqueous phase by high molecular weight polymers, the formation of microgels which increase the viscosity of the water, or by the attraction of the thickener to the latex particles so as to produce a network of connected particles.

Thixotropic index

The function of the additives considered up to this point has been to develop a certain degree of thixotropy, depending upon the coating method involved and the conditions under which the coatings are applied. This is sometime called the leveling index. It is readily apparent

(8) that the thixotropic effect of the coating mixture determines the pattern of the dry coating.

Sometimes the thixotropic index is determined by the ratio of the viscosity at low shear to that of high shear. The leveling index has been calculated by the following formula: $I = M/U2$ where M is the coefficient of shear thixotropy and U2 is the plastic viscosity. By using this formula, it was established that I values below 0.2 to 0.25 represented inoperable coating mixtures, 0.25 to 0.35 represent the borderline region, and values above 0.35 give good operability.

Other additive effects

There are a number of materials called additives which are added to coating mixtures for various specific reasons in order to make coatings with greater uniformity and with greater ease of application.

Defoaming agents

A defoamer additive is used in many coatings to prevent the formation of excessive foam. Whenever air becomes entrapped in the coating mixture, the flow characteristics are modified and the viscosity usually increases. The coarse air bubbles are usually not troublesome because they rise to the top and do not influence the viscosity of the coating. The fine entrained air bubbles remain dispersed in the coating and may give flow characteristics which will not permit the coatings to be applied properly. The types of materials used for foam killing are pine oil, octyl and capryl alcohol, sulfonated oils and tallow, kerosene, tributyl phosphate, fusel oil, skimmed milk, turpentine, silicones, and evaporated milk. Sometimes ultrasonic waves are used to eliminate entrained air bubbles from the coatings. All these materials when used effectively have a tendency to keep the coating mixture flowing more freely.

Leveling agents

It is also customary to use additives which are called leveling and evening agents. These include wax emulsions, stearate soaps, and modified oils. When used in the proper amounts, these materials will give free flowing coatings of the Newtonian types, and will also modify the hysteresis loop in the thixotropic coatings. Good wax emulsions ordinarily do not change the flow properties of the coating very much because the amounts used must be kept low in order not to make the paper slippery. Calcium stearate soaps have been found to reduce the viscosity of starch coatings quite materially.

Plasticizers

Another type of coating additive is the softener or plasticizer. While these are used to make the coatings more flexible, they also influence the viscosity of the adhesive and modify the flow characteristics of the coating mixture. A chemical plasticizer is effective when it finds its way between the molecules of the adhesive so that it will destroy or weaken some of the cohesive bonds between them. When these cohesive forces are thus modified, the coating film will be not only more flexible, but the coating mixture itself will have a lower viscosity and will be more free flowing under shear.

Dispersing materials

It is to be assumed that the dispersion of the pigment si as complete as possible before the adhesives are added. Dispersing materials such as tetrasodium pyrophosphate, sodium hexametaphosphate, sodium lignosulfonate, sodium naphthalene sulfonate, and sodium silicate are quite widely used as dispersing agents for pigments. In addition to these, there are certain pigments, especially talc, in which it is necessary to use wetting agents before the dispersing agents are used in order to get complete deflocculation and stable dispersions. In addition to sulfonic acids and their derivatives which work quite well, pine oil is sometimes used. Their function is to wet each pigment particle completely so that when the adhesive is added, a homogeneous mixture can be made which will flow freely and remain stable.

Adhesive shock

Sometimes a phenomenon occurs which is referred to as adhesive shock when the adhesive is added to the pigment dispersion. There are probably many different types of adhesive shock. One in particular which needs mentioning here is the shock that occurs when the adhesive seems to take the dispersing agent away from the pigment which causes coagulation or curdling. If this is the case, the addition of more dispersing agent under constant agitation might enable redispersion of the pigment and sometimes the mixture can be made into a smooth flowing mixture. In some cases it is well to have a protective colloid present before the adhesive is added which reduces the tendency to give adhesive shock. While this works in many cases, it is also true that casein very often exhibits adhesive shock and casein itself is a protective colloid. This is another evidence of what happens when the various components of the coating mixture do not blend homogeneously when the final mixture is being made.

Insolublizers

Still another group of additives which can influence the viscosity of the coating mixture comprises the various types of insolublizers which are added to make the coatings more water resistant. Among those used in protein adhesive coatings are formaldehyde and hexamethylene tetramine. These materials will insolublize the protein to the extent to which they are added to the coating mixture. One must be extremely careful in the amounts of these materials added because they might cause the protein to gel which very greatly increases the viscosity of the coatings. Along with starch, urea formaldehyde and melamine formaldehyde resins are sometimes used. If starch is the only adhesive, they do not influence the flow properties of the adhesive to any great extent.

In free flowing coatings it seems to be necessary to have good deflocculation, but with enough binder and high enough viscosity to avoid settling to a stage of minimum voids. If this were to occur, then dilatancy will set in which gives trouble in practically all coating mixtures. Thixotropic flow sometimes appears to be the effect of imperfect compatibilities of the various components at high solids. In different types of coating mixtures different effects are obtained when they are made up at 65 per cent or higher solids. There one must be on the lookout for competition between the various components for the additives used. When an additive is taken away from one component by another one, compatibility of the components can be reduced which might give rise to thixotropy. It seems that flocculation is necessary in thixotropy and this would follow according to the above statement. There is also the possibility that different structures can be built up by the different components. This would most certainly influence the flow properties of the coating mixtures.

Surface active agents

The surface active agents that enhance wetting are referred to as

Continued on page 238

USE OF COLORANTS IN MODERN PAPER MAKING

JOSEPH W. DRAGONETTI

Dyes with excellent affinity for the pulp and possessing good solubility must be used to obtain maximum color value on today's high-speed paper machines.

THE importance of color in increasing paper sales has been highly emphasized in publicity of the industry, but meanwhile — at the mill application level — coloring paper continues to be considered a relatively minor detail in the papermaking process. So, at least, it appears to T. F. O'Brien and Mr. Richard Cobden, two key executives in the Paper Dyestuff Sales & Technical Service Department of Sandoz Inc., New York, N. Y.

A clear evidence of this neglect according to Cobden, who is chief chemist, is the occasional submission, to his lab, of long established color formulations in which from five to eight different dyes are specified. Upon inquiry, it becomes apparent that the present formula bears no resemblance to the original color combination; over a period of years, additional dyes have been added, in order to achieve successive changes of shade — and, of course, to cover up the effect of colors already in the formula. Generally, Cobden states, it's relatively easy to replace an unwieldy color formulation like that with just two or three modern dyestuffs. This will lower the cost per ton and reduce a color room's dye inventory. Often it also gives better color fastness, and more uniform running properties, too.

Dyes for continuous coloring systems

High on the list of today's paper coloring problems, O'Brien (Manager of Sandos Paper Department) says, is the investigation of dyes for use in continuous coloring systems. Briefly, the problem here is that the faster the machines go, the less time there is for contact between the dyestuff and the pulp. For maximum color value, the continuous system mill must use dyes with excellent affinity for the pulp and with good solubility.

Consequently, pulp going through a traditional beater operation is likely to be colored with a dye that is different from that used on the same pulp in a continuous system, although the paper from each operation would be identical in shade.

As an example of dyes suggested for continuous coloring, Cobden listed the following for red shades:

1. If added to an unbleached pulp at the head box,
   RED basic dyes
   Rhodamine B Conc.
   Safranine Y Conc.
2. If added at the fan pump, or preferably, for better mixing, in the line leading to the fan pump,
   RED direct dyes
   Benzo Purpurine 4BS Conc.
   Chloramine Fast Scarlet 4B Conc.
   Pyrazol Fast Red 8BL
3. If added to the machine chest,
   RED acid dye
   Croceine Scarlet FL Conc.

Choice of a basic, direct, or acid dye depends to a great extent on what qualities are required. The basic dyes have fair solubility but their color fades rapidly. On unbleached pulps they will give excellent money value. The direct dyes have fair to good solubility, and good fastness to light. On unbleached pulp they would show good money value. The acid dyes are characterized by excellent solubility and excellent fastness to light. On unbleached pulp they provide fair money value. Acid dyes also give a bright shade and show the minimum tendency to granite on a mixed furnish. However, due to less affinity for the fibers, the acid dye would probably be added to the machine chest, to insure sufficient mixing and contact time. This means that more of the machine will have to be cleaned when a new color is used.

In contrast to the separate groups of dyes which he suggested for the continuous process, Cobden pointed out that in a beater process, direct, acid, and in some instances even basic dyes may be used in combination. This is possible because the increased mixing and contact time minimize the difference in exhaustion rates and affinities of the various dyes.

According to O'Brien, the increasing trend to continuous processes has also caused a change from pigments to dyes for paper coloring; pigments being finely divided solids, insoluble in water. Pigments, while having the highest degree of fastness to light, require special attention to achieve even dispersion throughout the rapidly metered furnish. Incorrectly applied, they can result in "two-sided" papers. They are, however, increasing in favor for coloring for packages and food wrappers.

Trend toward greater whiteness

Side by side with increased trend toward the use of color to stimulate paper sales, there is a seemingly insatiable demand for greater whiteness in papers. For this the paper dyestuff and chemical supplier is delivering a paper industry version of the fluorescent white dyestuff which also makes the housewife's wash "whiter than white". While the use of optical whiteners in paper is no longer news, improvements in the product are still being achieved, the latest being an optical brightener for use in closed white water systems containing alum and free acid.

Another improvement in the use of optical whiteners, is in the method for adding the brightener to a furnish which contains increased amounts of groundwood pulp. In early trials, it was found that brighteners have a strong affinity for groundwood, but lose their brightening effect against the unreflective background of this fiber. As a result of new application research work, however, an acid stable brightener, Leücophor C, can now be added to the bleached sulfite stock, before any groundwood is incorporated into the furnish. Once the whitener is on the bleached stock, where it has a chance to "shine", up to 40 per cent of groundwood may be added before the whitening effect is spoiled.

Colors to overcome two-sidedness

Other problems facing the paper colorist, deal with the use of colors to overcome two-sidedness. The problem of two-sidedness has been aggravated by the demand from the converter and printer for increased opacity which requires the use of more and more filler. Other factors contributing to the problem are higher speeds of paper making machines, as well as the use of more short-fibered pulps.

A major factor in two-sidedness is recirculation of "white water" containing colored fines and fillers. Most dyes have different degrees of affinity for fines, fillers and fibers, and the trouble starts when the fillers and colored fines go back on top of the sheet in the manufacturing process.

This and other problems are of such major importance that Sandoz recently published "Change for the Better", a handbook on dyes which, among other classifications, lists many dyes with their side-uniformity ratings.

Featured as "wire side" dyes are: a red, Croceine Scarlet FL; a yellow, Trisulfon Paper Yellow Conc.; and as generally non-two-sided dyes: a red, Pyrazol Fast Fed 8BL; three yellows, Chinoline Yellow KT Extra Conc., Chinoline Yellow O Conc., Chloramine Fast Yellow CD; three blues, Alizarine Light Blue B; Bond Blue B, Pyrazol Fast Sky Blue 7GUL; and various "felt side" dyes — dyes that have a preferential affinity for clay, including all basic colors and some direct dyes.

Other trends include the paper industry's desire for wider use of bleachable dyes and for improved bleed fastness.

The paper maker is both re-examining and re-evaluating the three classes of dyes — basic, direct, and acid — used in colorants and their specific characteristics.

O'Brien and Cobden point out that the present trend in the paper industry is toward the development of papers to fit specific needs. This does not mean, however, that the industry is rushing into all new developments.

Costs, new colorants and services

Cost is very important in specifying colorants. This was dramatically illustrated recently when one of the country's biggest mills sought a substitute for a certain Red it was using for kraft paper. The Sandoz lab tested a number of colors, but it finally recommended an old reliable: Trisulfon Congo Red. As a result, the mill cut costs on this project by 25 to 30 per cent.

New colorants for the paper industry are often gathered from dyes or pigments developed primarily for textile use, but many are developed especially for application to paper.

A current instance is a new direct dye called Chloramine Fast Yellow CD. It replaces at the same cost, an older, standard Stilbene Yellow, but imparts to paper such benefits as better fastness to light and bleeding, better bleachability, and freedom from two-sidedness.

Far less frequently, the dyestuff industry succeeds in introducing an entirely new and revolutionary class of colorants. At present, this is occurring in the textile field, with what are called "fiber reactive dyes". A completely new category of colorants, those dyes are chemically fastened to cellulosic materials by means of heat fixation. So far, little is known as to their possibilities on paper.

In line with the policy of checking all new products for possible market significance, however, the Sandoz Drimarenes are being subjected to exhaustive tests. This entails complete duplication of mill conditions in the company's laboratories.

For example, when the company is asked to match a submitted shade, or suggest a formulation, it requests the mill to send actual samples of the pulp in which the color is to be used. The Sandoz lab then makes hand-sheets from these pulp samples and often also uses fillers supplied by the mill. All other conditions which are likely to occur at the mill are simulated for full reliability of results from the lab's modern equipment.

Some mills ask the company to help solve specific problems encountered in run-of-the-mill operations. A typical case is a recent inquiry concerning trouble with specking on a pink shade.

The offending sample was reportedly dyed with a Croceine Scarlet FL. Upon examination, it showed considerable fluorescence under ultraviolet light. It also faded very badly in less than one hour, losing its bluish cast and changing to the shade of straight Croceine Scarlet FL. Both of these facts indicated the presence of Rhodamine. When the specks proved readily soluble in alcohol, but unharmed in a hypochlorite solution, identification of the offending color was accomplished. The specks were Rhodamine, one of the few colors that should not be added dry to a beater, because of its poor solubility.

start-up report

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(for details, please turn page.)

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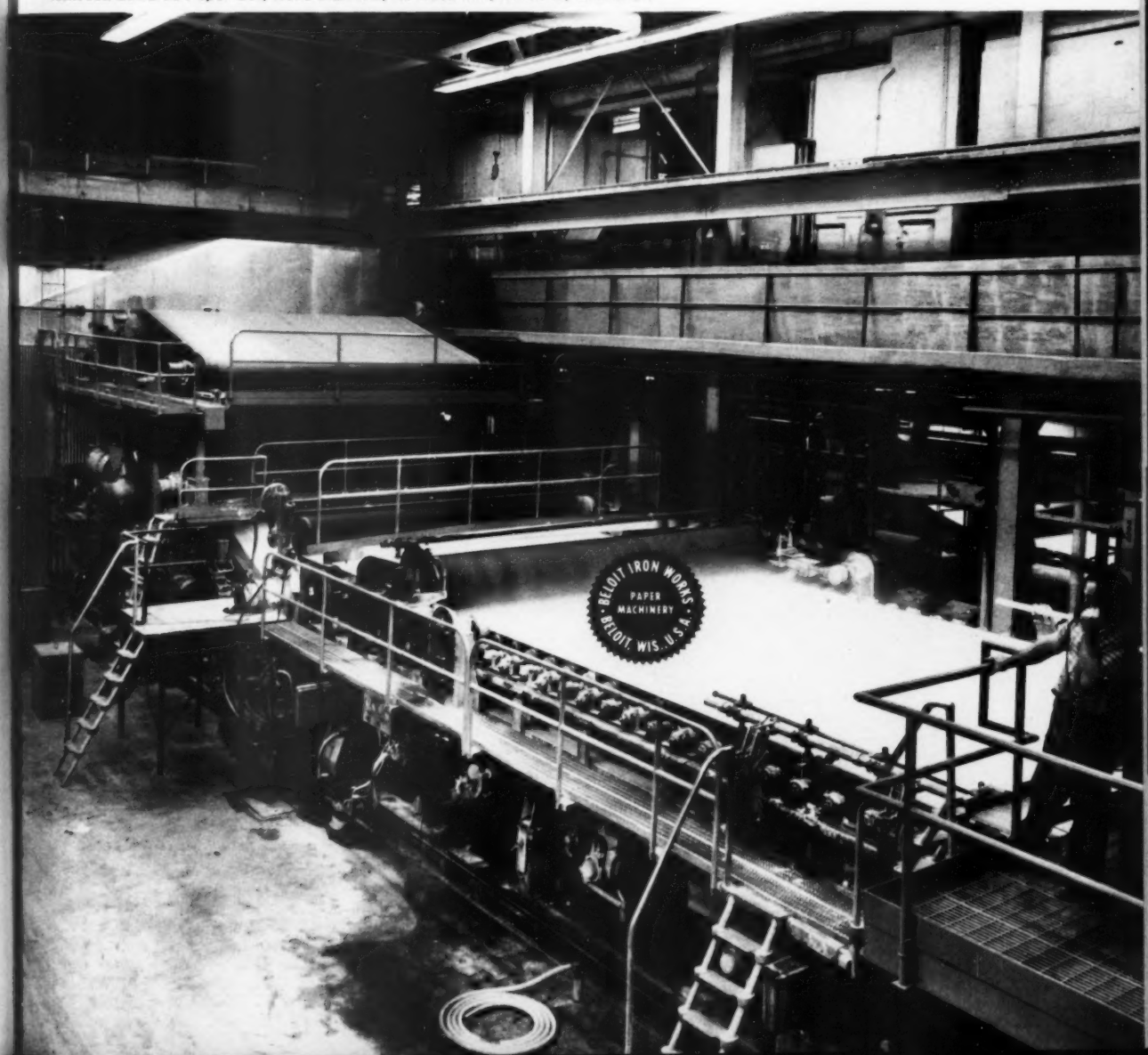

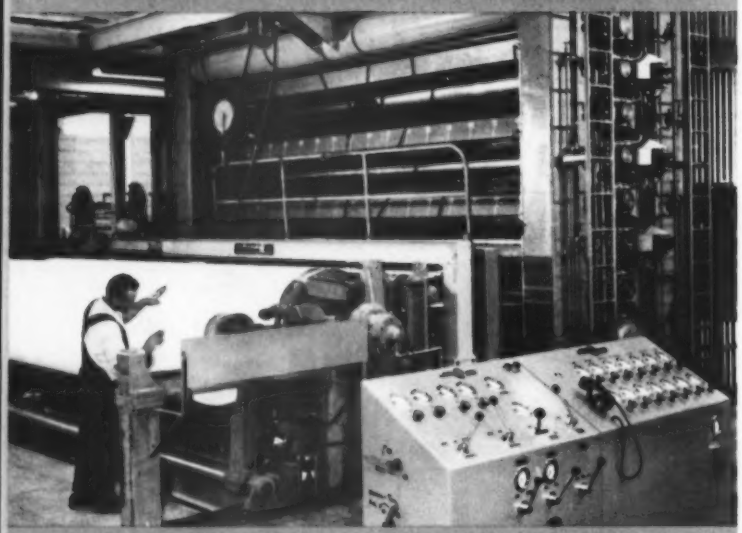

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Designed for speeds in the 1500 fpm range producing Nekoosa's famous line of business and printing papers, this machine has a rated daily capacity of 170 tons. Brought into production at approximately 800 fpm on 40 pound offset bond, "The Charles H. Reese" increases Nekoosa's over-all productive capacity of quality papers more than 20%.

(a) Beloit LLR reel with 36" constant speed drum. Control console is arranged for maximum operator convenience. (b) Straight-through press. Note inverse, air bleed second suction press and open draw arrangement for effective transfer of sheet from wire to felt. (c) Beloit Type E air-cushioned inlet and removable Fourdrinier. (d) Horizontal size press following main dryer section designed to apply size or light coatings. (e) Calender stack equipped with patented nip relief arrangement.

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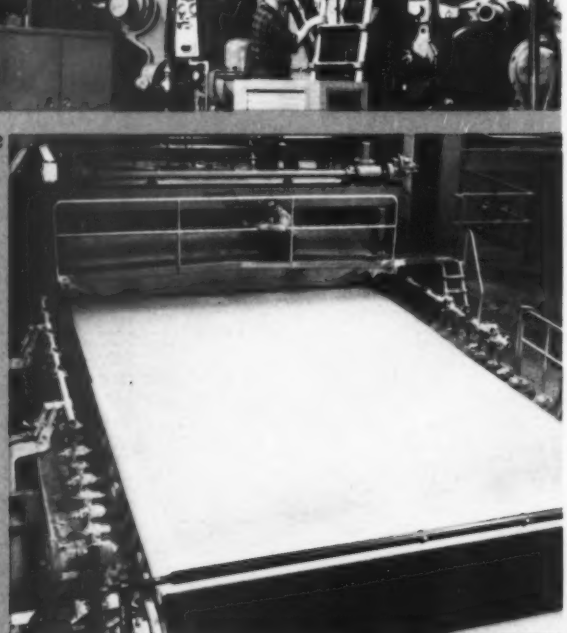

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PHOTOS BY R. H. CHRISTENSEN

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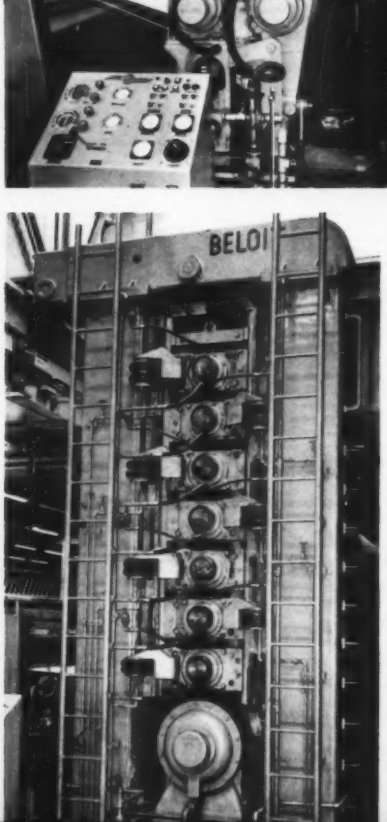

e

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POLYSULFIDE PULPING

I. W. SCOPP

I. W. Scopp Associates

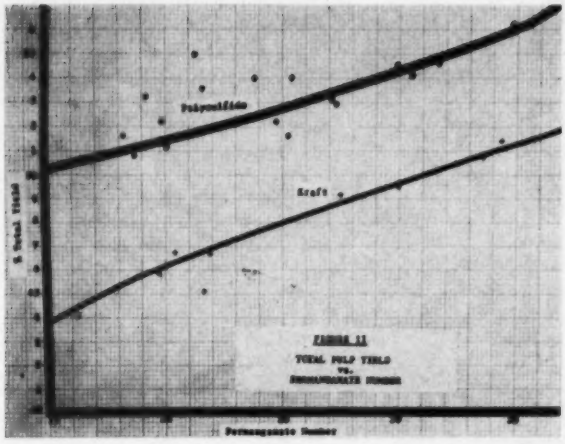
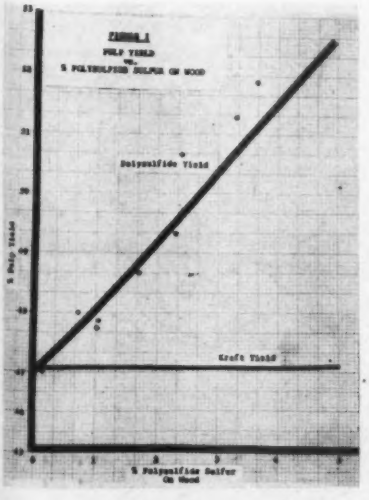


FIGURE 11
TOTAL PULP YIELD
VS.
PERMANGANATE NUMBER

Yield increases in excess of 8.5 per cent of those obtained by the conventional kraft process are claimed by the author when using the polysulfide pulping method.

UNPRECEDENTED increases in yield may be obtained by pulping with polysulfide solutions. The substitution of sodium polysulfide for sodium monosulfide in the conventional kraft process, using existing equipment, will result in an increase in yield in excess of 8.5 per cent. The quality of the pulps resulting from polysulfide pulping compares favorably with the conventional kraft pulps. The bleaching of polysulfide pulps is accomplished with ease and the resulting pulps are similar to the bleached kraft pulps. There is less corrosion with polysulfide pulping than with conventional kraft.



The beneficial effects of an increased yield and improved pulp properties in polysulfide pulping are not obtained merely by the addition of elementary sulfur. The addition of sulfur to the kraft pulping process is well known. When sulfur is added to the caustic liquor, sodium monosulfide, sodium thiosulfate and hydrogen sulfide are formed, as noted by the chemical reactions:

$$8S + Na_2S + 6NaOH + 3H_2O \rightarrow 2Na_2S_2O_3 + 2Na_2S + 3H_2S + 3H_2O$$

Sulfur dissolves in heated sodium hydroxide:

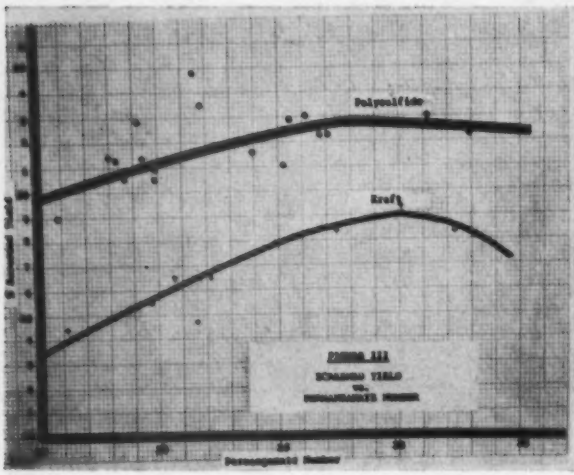
$$4S + 6NaOH \rightarrow Na_2S_2O_3 + 2Na_2S + 3H_2O$$

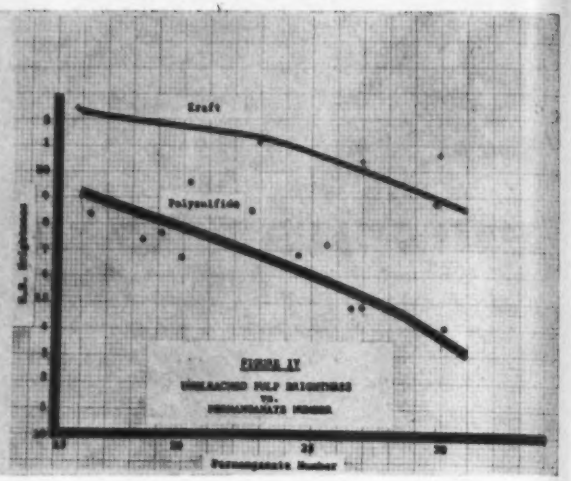
It is doubted if any tangible quantities of polysulfide are formed by increasing the quantities of sulfur.

The polysulfides in this laboratory study were purchased from Food Machinery & Chemical Corp. The granular polysulfides were dissolved in distilled water in a bottle previously purged with nitrogen. After solution, a layer of kerosene was added to prevent oxidation and the solution was allowed to stand overnight for settling before analysis.

Use may be made of the spent liquor by returning the sulfur losses in the system and conversion to polysulfides. Elemental sulfur is cheap enough to replace the sulfur losses and restore the polysulfides. The formation of sodium thiosulfate must be avoided since thiosulfate will negate the increase in yield of the polysulfides.

Search of the literature does not reveal true pulping with polysulfide solutions in lieu of monosulfide. Berthier prepared his pulping solution "by dissolving sulfur with heat in an Na_2S solution or an NaOH solution". Peckham and May used "flowers of sulfur added to sodium hydroxide solution to form polysulfides in the so-called soda-sulfur cooks". Fuller and Woodside used sulfur and soda ash to form a synthetic salt cake to prepare their solutions. None of these methods are different from Richter's Patents No. 1,689,534 and No. 2,007,024, which add sulfur to a soda or hydroxide solution. In all these attempts, sufficient polysulfides were not formed to obtain the beneficial effects of polysulfide pulping. In the kraft process, sulfur has been added all the way from the dissolving tanks to the digester with conflicting results for many years.





It is to be noted that the procedures used by these researchers do not clearly distinguish the polysulfides from the other reducing agents. Techniques commonly used in the kraft industry do not differentiate between polysulfide and monosulfide sulfur. The best method of analysis is that of R. B. Kessler (TAPPI, *40* no. 10: 802-9 (Oct. 1957) which will be found to give fairly good separation of sulfide, polysulfide sulfur, and thiosulfate.

To obtain the yield advantage in excess of 8.5 per cent, sodium polysulfides should be substituted for sodium monosulfide. The conventional kraft equipment used for kraft pulping, pulp washing and screening, liquor evaporation, combustion of liquor, and bleaching of pulp should serve equally well for the polysulfide pulping. The polysulfide process, by virtue of its mild cooking action, gives a significant increase in unbleached and bleached pulp yield.

The polysulfides are consumed in one run through the digester. No polysulfides remain in the black liquor. However, the concentration of monosulfides in the black liquor is three or four times as high as the monosulfide concentration in the conventional kraft process. The Black Liquor Analysis for the conventional Kraft and Polysulfide Process appears below:

BLACK LIQUOR ANALYSIS

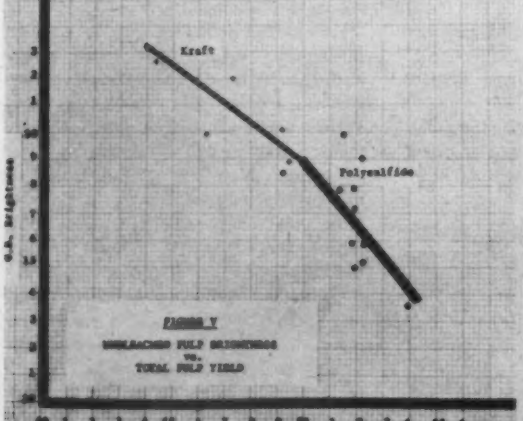
	Conventional Kraft	Polysulfide Pulping
pH	12	12
Active Alkali, gpl	12	18
Na_2S as Na_2O, gpl	4	18
NaOH as Na_2O, gpl	5	5

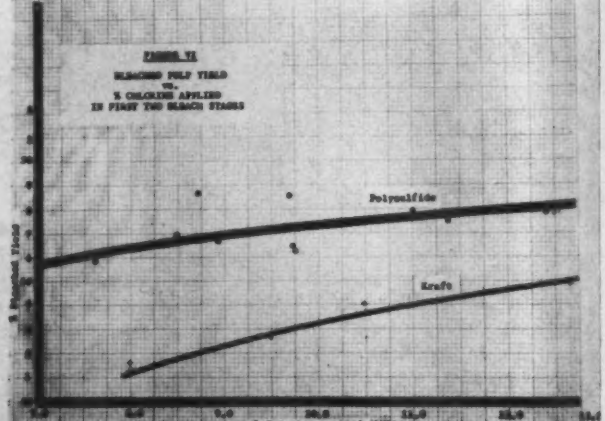
Conversion of kraft green liquor to polysulfide cooking liquor

There are a number of possible ways of converting the kraft green liquor to polysulfide cooking liquor. It would have to be determined which is the most practical and economical at the mill level and perhaps this would vary from company to company. The polysulfide waste liquor is rich in sodium monosulfides. Suggested methods for converting the green liquor sulfide to cooking liquor polysulfides are:

1. Make-up sulfur may be added to a portion of the green liquor already containing polysulfides. It is known that sulfur added to a sodium sulfide solution which already contains some polysulfides will form a solution richer in polysulfides.

2. To avoid the formation of thiosulfate, hydrogen sulfide may be passed through the liquor until saturated, forming sodium hydro-





gen sulfide. Then small quantities of elemental sulfur may be added and heated to near boiling. This will form a solution rich in polysulfides with a minimum expenditure of elemental sulfur and the avoidance of thiosulfate formation.

3. The green liquor may be electrolized which would result directly in the formation of polysulfides. The electrolysis of sulfide solutions has been studied in the laboratory and results indicate that the conversion to polysulfides is rapid and efficient.

4. The green liquor may be carbonated with flue gas and the hydrogen sulfide which is liberated may be oxidized to elemental sulfur in the presence of iron oxide. This sulfur may then be added back to the caustic liquor to form polysulfides.

5. Polysulfides may be formed by a combination of adding elemental sulfur to purchased sodium polysulfides and salt cake.

6. A combination of any of the above methods based on the economics involved.

The recovery of the sodium or alkali portion of the cooking liquor would be essentially the same as that of the kraft process, in that 93 per cent of the sodium in the digesters will be returned to the digesters in the next cycle. The recovery of sulfur in the conventional kraft recovery cycle is about 65 to 85 per cent efficient. The recovery of sulfur in the polysulfide system should be just as efficient.

Based on laboratory polysulfide cooks, the quantities of make-up chemicals may be estimated on the basis of the assumed chemical efficiency.

POLYSULFIDE RECOVERY AND MAKE UP

Active alkali	— 20% on wood
Polysulfide Sulfur	— 3.5% on wood
Total Sulfur	— 5.5% on wood
Total Sulfur	— 215 lb./ton of pulp
Sodium or Alkali recovery	— 93%
Sulfur recovery	— 60%
Saltcake Make Up	— 116 lb. /ton pulp
Total Sulfur Make Up	— 32 lb./ton pulp
Sulfur from 116 lb. Saltcake	— 25 lb.
Net Sulfur Make Up	7 lb./ton pulp

Pulp properties and advantages of polysulfide pulping

The properties of pulps resulting from the polysulfide process are quite similar to those resulting from the kraft process. The polysulfide pulps even give evidence of better bonding properties. Listed below are the average values of all unbleached polysulfide pine pulps compared with the average values of all unbleached kraft pine pulps which were run in our tests:

		Polysulfide	Kraft
Burst Factor	@ 500 Freeness	75	72
" "	" 300 "	80	79
Tear Factor	@ 500 Freeness	116	132
" "	" 300 "	104	116
Breaking Length	@ 500 Freeness	10,400	9,700
" "	" 300 "	11,300	10,600
MIT Fold	@ 500 Freeness	600	650
" "	" 300 "	800	840
Bulk Factor	@ 500 Freeness	1.61	1.64
" "	" 300 "	1.53	1.55
Brightness		17.2	20.3

Listed below are the average values of all the bleached polysulfide pine pulps compared with the average values of all the bleached pulp (all over 88 brightness).

		Polysulfide	Kraft
Burst Factor	@ 500 Freeness	61	59
" "	" 300 "	70	69
Tear Factor	@ 500 Freeness	125	143
" "	" 300 "	102	117
Breaking Length	@ 500 Freeness	7,900	7,800
" "	" 300 "	8,900	7,900
MIT Fold	@ 500 Freeness	550	470
" "	" 300 "	790	690
Bulk Factor	@ 500 Freeness	1.59	1.71
" "	" 300 "	1.48	1.58
Brightness, unrefined, G.E.		88.1	88.4
Brightness Stability (P.C. No. *)		1.79	1.54
Opacity	@ 500 Freeness	60	63
"	" 300 "	56	60

*Lower P.C. No. indicates better brightness stability

This will be realized if one examines Figs. 2, 3 and 4. This indicates that polysulfide cooking conditions may not have been the optimum. For instance, the kraft cooks, with only one exception, from a smooth curve of yield versus degree of cooking. However, the polysulfide cooks are widely scattered with some indicating double the yield increase of others. This indicates that there might be more important variables or combination of variables which, if controlled, might bring about further increases in yield.

Fig. 1 shows the effect of increase in the per cent of polysulfide sulfur on wood with pulp yield. As the per cent of polysulfide sulfur on wood is increased, the yield increases tremendously. From this chart can be seen why some slight increase in yield may have been obtained by the addition of large amounts of sulfur since some slight amounts of polysulfide may have been formed by adding large amounts of sulfur.

In Fig. 2, comparisons of per cent total yield between the new polysulfide pulping and the conventional method are made. For each permanganate number, the yields are consistently greater. It will be noted that the minimum yield increase on a wood basis is over 4 per cent, and this is consistent. This increase of 4 per cent based on the oven-dried wood amounts to 8.5 per cent increase based on pulp. Stated another way, a given quantity of pulp can be produced from 8.5 per cent less wood.

In going through our laboratory data, it was evident that there was greater possibility of additional yield increases in a polysulfide process by better selection of cooking conditions such as lower temperature and more active alkali.

Economics of polysulfide pulping

The monetary savings in using polysulfide pulping are substantial. In a company pulping 100,000 tons per year, an 8.5 per cent increase in yield will deliver 8,500 extra tons. At $100 per ton, the approximate price of unbleached kraft pulp, the annual increased income would amount to $850,000 per annum. Stated another way, 8.5 per cent less wood would be required to pulp 100,000 tons of kraft pulp. Parenthetically, the forest reserves of a large company could be reduced by this amount.

This is merely the beginning. With improved experience in polysulfide pulping, even greater increases in yield should be obtainable.

FINE PAPER SUCTION TRANSFER MACHINE OPERATION DISCUSSED AT ALBANY FELT ROUND TABLE

PERPLEXING problems of sheet pickup and dropoff as they apply to suction transfer machine operations were among major topics discussed at Albany Felt Company's recent two-day Round Table at Albany, N. Y., attended by 14 mill managers and superintendents from all sections of the country.

Larry M. Woodside, chief engineer, technical field service, moderated the meeting which was planned and developed by Samuel C. VanPraag, sales manager, and Robert D. Gregory Jr., assistant to the sales manager.

Other Albany personnel participating were Everett C. Reed, president; Harold F. Hedberg, vice-president, research and development; Z. J. Chagnon, executive vice-president; and Wayne G. Davis, vice-president, felt sales.

Also present were S. Stuart Engle, technical director; H. J. MacMillan, director of product design; Richard H. Root, designer; Carl C. Gordon, chief chemist; and Joseph E. Tanner, Clifford Van Buren and William H. Schaffner, district sales managers.

Sheet pickups and dropoffs

Poor pickup manifests itself in either the sheet not following the pickup felt at all, or dropping from the felt before it reaches the press. These problems are more apt to occur with a new felt than with a felt that has been on the machine a number of days. A superintendent from Maine said their only poor sheet pickup problems were with new felts. On the other hand, a paper mill superintendent from the south said they experienced this problem when the felt was near the end of its life. It was mentioned that the freeness of stock is related to dropoff problems.

The superintendent of a large mill in Michigan pointed out that, when experiencing pickup problems, they clean the holes of the suction pickup roll with a high-pressure shower with good results.

Another superintendent said that, in order to prevent dropoffs, they frequently force water back through the suction boxes to clean them. This also applies to suction rolls. A number of specialists like the idea of reverse water pressure or back washing, since it can be easily seen from the appearance of water coming out when the press shells are clean. One superintendent has one man responsible for maintenance and condition of each suction roll. This pinpoints the responsibility and has worked out quite well.

An Eastern mill manager said 90 per cent of their dropoffs occurred on the edges. By this he meant their felt did not pick up and hold all of the sheet when the pickup roll was lowered. Larry Woodside mentioned that a fine paper mill in the Midwest puts the travelling squirt on the felt rather than on the wire. A Southern mill manager said they grooved a table roll on both edges to help make the felt a little wetter. This decreased the dropoff problem considerably. Stuart Engle reported a spray on the inside of the wire in front of point of contact was sometimes of value. A number of men agreed that wetting the sheet with a shower on the inside of the wire between the couch and the pickup roll helped get the sheet across. In almost all cases the showers can later be turned off and the sheet will continue without difficulty.

The consensus was that there must be enough vacuum available at the pickup roll to secure proper pickup. It was brought out in general discussion that vacuums vary from 15 to 20 inches and that a more accurate way of looking at the problem would be to consider 25 cfm/in on a 4-inch suction box as adequate. A superintendent from the south said they noticed dropoffs occurring when the machine went beyond a given speed. He attributed this problem to a certain characteristic of the wire made by one particular manufacturer.

Felt characteristics

The question of "What makes a pickup felt pick up?" elicited considerable interest. There seems to be no single answer. Good felt design certainly enters into the picture. It is known the vacuum picks up the sheet, but then there is the question, "What makes it stay on the felt"?

Some experts attribute it to the film of water on the surface of the felt. Others feel it is the water traveling through the felt; some believe it is the differential in air pressure.

Woodside reported we know there is intimate contact or capillary attraction that makes the sheet stick to a pickup felt on a Yankee tissue machine. He also stated the older a pickup felt is the smoother and harder it gets. This presents a greater attraction for the sheet to the felt. In fact, it is possible to manufacture a felt so hard it will not release the sheet to the dryer. If such a felt were made up for a suction transfer position, as it aged, dropoffs would result.

Joseph Tanner pointed out a great many machines can operate on a reduced vacuum once the sheet is picked up. It was Woodside's thought that once you have the sheet picked up, a different group of forces, mainly lateral, reduce the effect of gravity. Woodside said he no longer accepts the idea of embedding the sheet in the felt, but does feel the sheet can be embedded in the wire from the contact of the roll against the wire. He doubted the sheet can be picked up without vacuum.

Reasons for various designs

It was pointed out by Designer Richard Root that the first pickup felt design for transfer positions were based on the principles of a pickup on a Yankee fourdrinier. They were smooth and fairly close in texture. This was in keeping with the idea that a film of water was needed on the surface of the felt to facilitate pickup. In many instances these felts proved to be too close, filling up too early in life. Subsequent designs were made in Fine Press and Super Press classifications. The result was better operation, particularly on machines using

large quantities of filler.

Engle added that the problems of the straight-through machine and the twin-ver machine were different, and were not quite as critical on the suction transfer rig. In some mills the Super Press construction is more successful than the Fine Press. However, in other mills finer felts work better. Woodside is of the opinion the choice of fine felts is indicated more by preference of the superintendent rather than by requirement of the machine. He remarked that in cases where finish is exceptionally important, the superintendent or mill manager does not want to risk losing the finish for the sake of the economy of going to a coarser, less expensive felt.

The manager of an Eastern mill told about an occasion when coarser felts on coated grades definitely did mark the sheet. A Midwestern mill superintendent went on to say they had a very serious wire mark problem. They found that, by going through the first press, the wire mark was eliminated but a felt mark was left. By the time the felt went through the second press, the Super Fine Felt removed the wire mark.

One of the mill superintendents was in agreement with the thought that in a great many cases personal preference decided which felt would be run. He emphasized this by stating, "The felt liked best will run best."

A number of participants running newsprint said they use Common Wet Felts without any problems, the felts being removed from the machine for reasons other than filling up. A Midwestern mill superintendent pointed out the basis weight of the sheet has a great deal to do with the type of felt to be used. He said he would be more likely to get marking on a heavier sheet than on a lighter one.

A general superintendent reported on the case of a Duplex Felt which by error was installed inside-out. When this had been corrected, they could see no difference in the finish. This comment brought out the question of how successful Duplex Felts are on book and printing grades. Mr. Engle said that for the same weight, Duplex Felts are more open than conventional felts, and have been very successful on these grades.

It was asked if a felt which is singed bare operated better (less dropoffs) than a felt with nap. Woodside said the sheet will follow the pickup felt after the press more readily if the felt does not have a nap. He continued that we are gradually getting away from napped felts. It was explained that for many of our customers the felts are napped and then singed bare. Engle added there are no pickup felts put on the machines unless they are singed. Most of them are given a hard singe.

Woodside asked if those at the meeting had found that starting a new felt light or slack made any difference. One mill was starting them slack with no problem. However, Albany Felt feels they should be started at the manufactured length, which is taut.

The matter of taking nip impressions was discussed, with a number of mill men pointing out they only take impressions when they definitely suspect a machine problem. Woodside said some mills do it periodically when they change press rolls. A Midwest mill has developed a method of taking nip impressions by using a quilted foil with carbonless impression paper on the top. They get a very sharp impression which can be measured exactly. This combination has provided excellent results.

Felt cleaning and conditioning

In the area of felt cleaning, it was suggested that before recommending a wash for a specific machine, tests of several types of washing materials should be made. For shutdown washes, some felts clean best with an acid-synthetic wash, others with alkaline-synthetic. Non-ionic synthetics are preferable to true soaps.

The frequency of cleaning, of course, is best left to the superintendent. Better operations can frequently be effected if the felts are cleaned continuously or while the machine is in operation.

A superintendent from Maine reported they use soda ash with a new felt. Chief Chemist Carl Gordon added that if there is precipitated soap in the felt, by using soap on an acid felt, the soda ash will emulsify the felt's acid and provide a cleaner felt.

One superintendent said he started his felt washing before the sheet was taken over the felt so they really start conditioning the felt before starting to make paper. One reason for doing this is to get the loose fibers off the felt; another is to start "conditioning." This procedure is recommended by Albany.

Equipment

It was noted that most participants had suction wringer rolls and some had Uhle Boxes. A Southern mill manager was particularly pleased with his five-shoe Vickery installation. These five shoes are equivalent to one for every 50 inches of felt travel, and it was reported the felt is not too wet after the Vickeries. He believes they are getting better cleaning results from the Vickeries than from Uhle Boxes.

Another superintendent from a Southern mill mentioned they had installed Uhle Boxes on some of their machines, and that if the felt can be kept dry enough they have worked very well. Engle and Woodside observed that with a Uhle Box and shower arrangement a felt is uniformly drier when delivered to the nip.

A Southern mill manager asked if anyone had experience with worn or damaged brass wringer rolls causing felt problems. It was agreed that rolls in poor condition definitely would injure felts. One participant said he is operating without using his wringer rolls. A West Coast superintendent added that, when a suction wringer roll is used, a great deal of water must be employed to lubricate the wringer roll and to keep fines from filling up the holes. A few mills were able to eliminate wringer rolls successfully by using Uhle Boxes.

Woodside stated that, when Uhle Boxes are used, water volume rather than pressure is of major importance. He also explained that a shower ahead of a Uhle Box must be oscillating and moving evenly, in order to avoid a buildup of pitch or similar residue. Where pitch is a real problem, Facid CE-12 has worked very successfully in many applications.

Wire speed vs. felt speed

All participants indicated the felt was run faster than the wire. A Midwest superintendent said he did not feel it made any difference as far as the pickup felt was concerned. Another thought that the felt running faster than the wire tended to minimize wire impressions.

This superintendent said he knows the felt does help drive the wire. Another superintendent from the East makes it a practice of running the felt six to seven feet faster than the wire at speeds of about 1700 fpm. However, too much of an overrun may cause scuff marks. Another superintendent remarked scuff marks are caused by certain types of wires, but can be minimized by adjusting draws.

Woodside said it is not possible to get the actual speed of a felt

when pulling it through the nip. The maximum length would be at the nip, and it cannot be measured at this exact point. While the difference may be very slight, there would still be a difference.

One superintendent declared the pickup roll speed could be measured by couch roll speed. Another reported readings were taken on the wire itself and pointed out that, when they ran into dropoffs, too much speed was the problem.

The West Coast superintendent said dropoffs usually occurred when the press section was running slower than the wire.

Two-sidedness and wire marks

The question of what can be done to eliminate two-sidedness of the sheet was discussed. In this instance two-sidedness pertained to color. The point was made that the color used would make a great deal of difference. Some pigments wash out, this being an important aspect of the problem. Changing the amount of filler will also change the depth of the color. An Eastern mill had a tremendous problem on a canary yellow paper and ultimately solved it by putting a table roll in a color vat just ahead of the couch roll after the sheet had passed over the suction boxes.

Angle of pickup felt leaving nip

It was stated that on occasions the sheet will follow the pickup felt after the transfer press on a straight-through transfer machine. In order to eliminate this problem, one man lowered the tail roll inside the pickup felt just past the transfer press. Another recommended a screw jack on this roll. It was reported that changing the position of the suction box does not help.

One superintendent with a twin-ver machine explained their sheet dropoff normally occurred soon after the pickup roll, but on several occasions they noticed the sheet edge turned over just prior to the ingoing nip of the first press. The question was raised as to the speed relationship between the pickup roll, tail roll, and the first press. The theory had been advanced that the suction tail roll was turning faster than the first press, causing the felt to relax slightly, which in turn allowed the sheet to drop away from the felt. Vice-President Harold Hedberg asked if this could be caused by centrifugal force of the roll. Woodside felt this problem went directly back to the pickup roll and the problem of edge flutter, although there might be stretch before or after the tail roll.

Edge wear

The question of undue felt wear at the edge of the sheet on transfer machines evoked considerable discussion. A Midwestern mill superintendent reported they had overcome this problem by dubbing the rubber covering at the edge of the roll, giving the water a place to go. Another superintendent mentioned they started wearing edges after changing rolls, and overcome this by dubbing the edges of the press roll.

A superintendent from the South mentioned a leading machine builder drilled all their holes through the roll shell to within two inches of the end. With this, along with the use of dubbing, they have had no trouble. Another superintendent reported they also dubbed their rolls so they would not have the influence of the high edge. He also believed the drilling was necessary since it provided a place for the water to go.

The question was asked if a hard press roll on the top rather than a P & J 42 hardness roll would improve drying, and what effect it would have on felt wear.

Woodside stated faster water removal would be accomplished with a harder nip. The question involved is, "Does the increased nip area from a soft roll offset the higher pressure with the smaller nip?" It was the opinion the answer could only be found by actual trial. A West Coast superintendent stressed that a roll with a P & J of 42 requires considerable maintenance, and a harder roll would run much better. Woodside believed life would definitely be lessened by the harder roll.

Shadow marking

It was agreed that getting the proper felt is the most important factor in correcting the shadow marking problem. All concurred that shadow marking gets worse when the felt fills up. It would appear that shadow marking is worse on a twin-ver than on a straight-through machine.

In the discussion, Woodside asked if it were possible to get shadow marking on an air-bleed press. He further stated he did not believe the vacuum causes the shadow marking. It was his feeling that suction hole or shadow marks in the sheet are caused by a difference in water removal between the drilled hole and land area of the suction roll.

The most common factors contributing to shadow marking by a suction roll include: position of the suction box, size and condition of drilled holes and drilling pattern, hardness of top and bottom rolls, press weighting and the type of felt used. Possibly the most important is press weighting.

To be continued in next issue.

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COATING ADDITIVES

Continued from page 228

wetting agents, emulsifying agents, detergents, surfactants, frothing agents, and defoaming agents. In some cases they are heteropolar substances in which the polar and non-polar portions can react with hydrophilic and hydrophobic materials respectively. It is customary to evaluate them by determining their effects upon viscosity, flow characteristics, and yield values. Sometimes the settling of the dispersed phase upon dilution is used as a sensitive test for the surface active agent. The settled volume of the dispersed pigment is small while the settled volume of the flocculated pigment is relatively large. Surface active agents can be used to reduce the viscosity to permit the use of higher solids coating formulations.

When one considers the multitude of different types of coatings made throughout the paper industry, it becomes obvious that there is no simple panacea for regulating the flow of the coating mixtures. It appears more feasible to understand what the different types of flow are, what influences them, and how they are made so that the coating technologist may control the flow properties of his coatings to meet the needs of the coating machine, the base stock, and the type of finished product which is to be made.

LITERATURE CITED

1. Belche, Jr., J. R. and Ellis, G. C.—Viscosity Control of Paper Coating Adhesives with Urea. Seventh Tappi Coating Conference in Philadelphia, Pa. May 7-9. 1956.
2. Dicyandiamide in Paper Coatings. American Cyanamid Co. reprint No. 41.
3. Azite 900 Liquefier. American Cyanamid Co. Technical Bulletin No. 21-A.
4. Parker, Harry.—Hodag Chemical Co., Chicago, Ill. Unpublished data.
5. Jahn, R. G.—Effect of Dow Latex 512-R on the Rheological Properties of Casein, Alpha Protein, and Starch-Bound Clay Coatings. Tappi 39. No. 10: 725-735. (Oct. 1956).
6. Claxton, A. W.—Modification of Coating Colors with Amines. Tappi 43. No. 3: 235-241. (March 1960).
7. Brown, G. L.—The Function and Mechanism of Latex Thickening. Rohm and Hass Reporter 7. No. 1.
8. Smith, J. Wilson, Trella, Richard T. and ware, Harris O.—Casein Adhesives in Roll Coating. Tappi 33. No. 5: 212-218. (May 1950).

PIMA HOLDS 42nd ANNUAL CONFERENCE

NEARLY 600 registrants were in attendance at the 42nd annual PIMA Conference held at the Robert Meyer Hotel, Jacksonville, Fla., on June 7-9. The conference was characterized by a major departure from the conventional PIMA program. The departure was that of including two days of mill tours in the program which was then followed by seminar discussion of questions directed to managements of the four mills visited, ie., St. Regis Paper Co., Hudson Pulp & Paper Co., Container Corporation of America and National Container Division of Owens Illinois Glass Co.

The conference opened with the general session, with Tom S. Coldewey, vice president of St. Joe Paper Co., presiding. The 1961-62 PIMA officers were announced as follows: C. Ives Gehring, Sealright-Oswego Falls Corp., President; Bemis P. Wood, Strathmore Paper Co., 1st Vice President; Glen T. Renegar, Container Corp. of America, 2nd Vice President; L. W. Murtfeldt, Consolidated Water Power & Paper Co., 3rd Vice President; Robert O. Stephenson, Champion Paper & Fibre Co., 4th Vice President; and Preston D. Carter, KVP Sutherland Paper Co., 5th Vice President. Harry E. Weston continues as permanent Secretary Treasurer of PIMA.

The three major winners of the 14th Bolton Award Contest were announced by F. Richard Convey, John W. Bolton & Sons Inc. as follows: 1st prize — Edward L. Schuette, Brown Co., Berlin, N. H.; 2nd prize — Clifton J. Walker, The E. B. Eddy Co., Hull, Que.; 3rd prize — Andrew P. Rego, Kimberly Clark Corp., Neenah, Wis. The theme of the Contest-Essay was: "Privileges of the Free Enterprise System".

Other prize winners in the Bolton Contest were Robert E. Lee Jr., Rochester Paper Co.; H. S. James Jr., Union Bag-Camp Corp.; Brad Block, Kimberly Clark Corp.; Mrs. Joan Graham, Packaging Corp. of America; Harry M. Bowzer, Dairy Pak Butler Inc.; Thomas H. Schumann, Mead Corporation; and Mrs. Margie Louise Cunningham, Packaging Corp. of America.

C. Ives Gehring
1961-62 President

Partners in distribution

G. Welling Pepper, vice president of Scott Paper Co., discussed partnership in distribution that exists between the production and technical men on the one hand and marketing and sales people on the other. He deplored the alarming degree of sameness of products put out by the paper industry. The most successful companies are those, he said, that have dedicated themselves to pleasing their customer instead of matching the competition. The production man, therefore, should know the wishes and the desires of the customer and, for this reason, Scott Paper has instituted a procedure whereby each executive of the company, with responsibilities mainly in research, engineering and production, must spend six days each year with various field sales groups within the company and one day with the company's internal marketing group. Those primarily involved in marketing, on the other hand, must spend four days at four different plants and two days at two geographically different woods operations.

Put the pay in what you say

Charles Bury of Charles Bury & Associates explained the intricacies of selling creatively, talking persuasively, and eliminating the "double talk" from communications. He showed how to use and package the explosive power of words in creative selling and persuasive communications.

The paper industry of tomorrow

Benjamin Slatin, APPA's economist, presented a critical review of some conclusions of recently made long-range forecasts that predict outputs of close to several hundred million tons of paper and paperboard by the year 2000. Such outputs can be achieved only, he pointed out, if we maintain the kinds of efficiency increases, the kinds of product developments, and the growth of the economy itself we have experienced in the last 40 years.

"If the industry can continue to increase its efficiencies in the use of all its resources then, on the one hand, there will be no danger of running out of any such resources, whether they be land, trees, water or manpower, even at the 2,400-million-ton level, and on the other hand, the market for these products will be virtually assured".

Research will determine future markets

J. Homer Winkler, technical advisor, Battelle Memorial Institute, stressed the need for increased research in meeting the competition from other materials. He said the paper industry requires a kind of stimulus provided by an estimated annual spending on research of some $260 million by 1970 as envisaged by David L. Luke. Current expenditures on research in the pulp and paper industry amounts to approximately 0.5 per cent of the sales dollar, while that of the national average exceeds 1 per cent and is rapidly approaching 2 per cent.

Some of the more pressing problems facing the paper industry where research is needed were listed as follows:

1. Magazine publishers want a lighter-weight paper with approximately the same bulk and opacity as the papers now used. They also want a paper which has equal printability on both the wire and the felt side, with both sides being smooth and having the same finish and ink

receptivity. An optimum coating technique should be developed for magazine paper stocks and there should be more uniformity in the finish of magazine paper which now varies from mill to mill and from roll to roll.

2. The entire field of printability needs more intensive study and coordination of results. The problem of determining printability of paper is a formidable one and will require much more research before it is solved. At present, the only sure way of determining printability is to print the paper.

3. In the binding area there is need for a test and grading system to predict whether a sheet of paper is suitable for normal perfect binding. Printed inserts often upset the balance of a publication when bound by the normal procedures. In hardbook binding, the tendency to curl of end sheets and end signatures causes frequent difficulties.

4. A comprehensive study of webbreaks is needed so that paper may be run through the printing press without breaks.

5. Improved methods of pulp drying and baling are needed to make pulp production on the fourdrinier less costly.

6. In pulping operations, the indirect cost of odor nuisance is staggering. A survey to determine the problem in all its phases should be undertaken and followed by basic studies on the elimination of objectionable odors.

7. The incorporation of plastic and resin materials in the paper fibers should be investigated with the view to develop new techniques and new products in packaging materials.

8. The whole area of corrosion in the paper industry requires definition and evaluation so that research efforts in this area may be guided into more productive channels.

9. In pulp refining we need to understand the intimate mechanism of the pulp refining process and the latitudes that remain for improving and rationalizing the production of refiners. The refiners now in use vary in design, method and operation and in the nature and quality of fiber modification they accomplish.

10. Opportunities for new markets in the field of expendable substitutes for textiles as well as the utilizing of chemical byproducts of wood pulping should be fully investigated.

11. In the container field, the production of paperboard containers should be automated as is done in the making of cans, bottles, plastic closures, etc.

12. In the area of instrumentation much remains to be done to (1) measure a variety of properties and conditions in pulp and paper manufacturing and (2) translate test results to production, etc.

The paper industry, Dr. Winkler concluded, can continue its growth only if it directs its research and all other activities to creating values for customers and then keeping the latter satisfied. The paper industry must not consider that its business is exclusively papermaking, but that it is a vital part of the communication, packaging, and the other business fields it serves.

ESTIMATION OF FIBER LENGTH INDEX

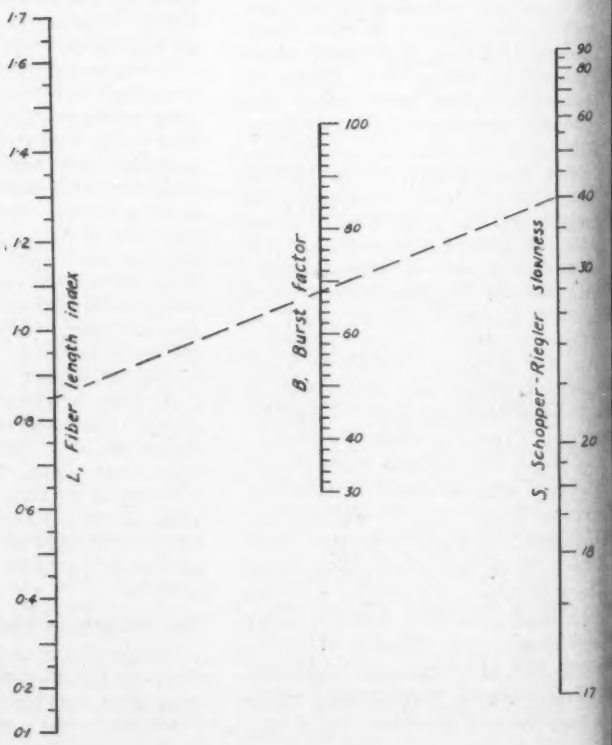
D. S. DAVIS
University of Alabama

FOR bleeched sulfate pulp, the relation of burst factor B, and fiber length index L, to Schopper-Riegler slowness S is expressed in the equation[1].

$$B = 40\,L + 30 \log (S - 16.5) - 7.1$$

This relationship affords a convenient means of estimating fiber length index from readily available data and is the basis for the accompanying nomograph, which was constructed in accordance with methods[2] described previously

The broken index line on the chart shows that a fiber length index of 0.85 corresponds to a burst factor of 68 and a Schopper-Riegler slowness of 40.



LITERATURE CITED

1. de Montigny, R., and Zborowski, P., Technical Association Papers, Series 29, 220 (1946).
2. Davis, D. S., "Nomography and Empirical Equations," Chapter 5. Reinhold Publishing Corp., New York, 1955.

Durasorb

Needled Felts

Pioneering in the challenging area of needled felt research and development has been continuous since 1955 with Albany Felt Company.

Design, research and field work on applications of this needled Durasorb construction for every type of asbestos-cement, paper and board production is being successfully accomplished.

This leadership in the needled felt field has necessitated careful and painstaking attention to *specific* paper mill production objectives. The results of such attention have been good, especially on multi-cylinder board machines.

While experience has shown that needled felts do not meet every papermaker's need, in many instances dramatically better finish, improved drainage or longer felt life have resulted.

Albany Felt Sales Engineers, with your help, can determine how Durasorbs can best serve you. Careful analysis of your needs, plus the expert assistance of our design and production specialists, will help you obtain *improved efficiency, better quality,* and *increased production.*

TALK *Durasorb* NEEDLED FELTS
WITH YOUR ALBANY FELT SALES ENGINEER

ALBANY FELT COMPANY
ALBANY, N.Y.

AF

Dedicated to Paper Industry Progress

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Cowansville, Quebec Cuautitlan, Mexico

DICALITE® TECHNICAL REPORT

DICALITE DEPARTMENT • GREAT LAKES CARBON CORPORATION • 612 SO. FLOWER ST., LOS ANGELES 17, CALIFORNIA

New Dicalite BULK-AID TRADEMARK for Paper Products

Dicalite BULK-AID is a new development in inorganic fillers, with particle size range and distribution carefully controlled to give maximum bulking characteristics in paperboard and paper products. BULK-AID has the lowest apparent or bulk density of any known mineral filler for papermaking use, thus providing required caliper at lower weights. One example is that of a 40-point groundwood sheet whose weight was reduced from 29.2 lbs/ft^3 to 27.3 lbs/ft^3 by the addition of 10% BULK-AID.

The light weight and bulking characteristics of BULK-AID make it especially suitable for use in paperboard; its high brightness and excellent retention are also of considerable value. BULK-AID lowers the furnish cost and increases pulp mileage in top liners for patent white paperboards. Its brightness and opacity raise the quality of underliners at the same time it extends the furnish.

Dicalite BULK-AID is an amorphous mineral, technically an aluminum silicate, produced from a volcanic mineral known as perlite by a special process developed by Great Lakes Carbon Corporation. BULK-AID is inert, insoluble in water, acid or mild alkalies. It is grit-free, and exhibits no reaction with alum in sizing or with other papermaking chemicals. It is readily dispersed in any furnish, does not cause foam, and will not fill felts.

Among BULK-AID's physical characteristics are these:

Color: White
Average G.E. Brightness: 83

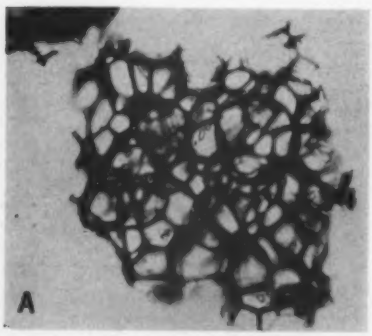
Loose weight: 4½ lbs/ft^3 average

Bulk densities in paperboard: 15 lbs/ft^3 average.

Particle size: 80% less than 10 microns

Extensive testing has shown BULK-AID to be successful in actual paper mill production. Most of these tests were on cylinder machines for paperboard production, but limited tests indicate its value in many slow speed fourdrinier applications.

Your Dicalite engineer will be glad to discuss BULK-AID with you and to advise on possible product applications in your own plant.



When perlite is crushed and then suddenly heated to the proper point in its softening range, it pops like corn into particles like that shown in photomicrograph A, containing a myriad of microscopic sealed cells. The size of the original particle and the application of heat are both important, and are critically controlled. This is the expanded material from which BULK-AID is produced. Controlled milling and air classification by an exclusive Great Lakes Carbon Process are the major steps in making BULK-AID, typical particles of which are shown in photomicrograph B.

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For more data circle 112 on Post Card

Gordon G. Halvorsen

DICALITE'S "MAN ON THE SPOT"

The development of Bulk-Aid, to meet the industry's need for an extremely low density bulking agent, was initiated by Gordon Halvorsen, Product Sales Manager for Dicalite, and he has been closely identified with its tests and product application work from the beginning.

Halvorsen has an extensive background in research and development work, beginning with his graduation from the University of Minnesota with a degree in Chemical Engineering. Prior to joining Great Lakes Carbon in 1940, Gordon had been engaged in technical and laboratory work in the pharmaceutical, corn processing and water treatment fields, and continued his research work in the Dicalite product laboratories for the first 5 years of his association.

Halvorsen is the author of several technical papers, and has contributed to both paper industry and brewing publications. Among his technical society memberships he lists TAPPI, American Society of Sugar Beet Technologists, Master Brewers Association of America, and others in the brewing and drycleaning fields.

NEW DATA SHEET

on Dicalite *BULK-AID* gives more complete information on physical and chemical properties, and on its advantages in papermaking. Write for your copy to Dicalite Dept., 612 So. Flower St., Los Angeles 17, Calif.

Regular Submersible

SUBMERSIBLE PUMPS

deliver water

economically

consistently

silently

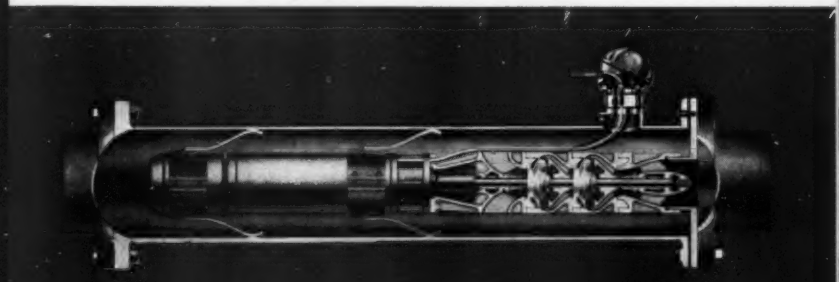
efficiently

The Layne Submersible Pump installation gives you noise free operation because the pump and motor are completely submerged. The Layne Submersible is adaptable to all wells; requires a minimum of space since no pump house is required; eliminates possibility of water contamination; and eliminates the opportunity for vandalism or other accidental mishap or damage.

Layne Submersible Pumps are available for wells as small as 6 inches and in capacities from 30 GPM up. For additional information write for free bulletin number 202.

The Layne In-Line Submersible pump provides the answer to many problems in booster pump applications. The pump operates as an integral part of the line and is designed for use by municipalities, industry, such as petroleum and chemical plants and by agriculture. Advantages include: simple installation, no additional space required, continuous service even under flood conditions, and no possibility of surface water contamination.

Layne In-Line pumps are made as small as 4 inch bowls on a 4 inch motor for use in a 6 inch pipe to deliver 30 GPM. Larger sizes are available as required. For additional information write for free bulletin number 203.



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coatings of Ethylex® Gums seek their own level

Perfectly smooth sheets are assured when you use Ethylex Gums in your coatings. How? The superior water-retention properties of Ethylex Gums allow time for coatings to level, minimizing surface irregularities and imperfections. The result? A smoother, more uniform surface with high pick values, excellent printability and good varnish holdout.

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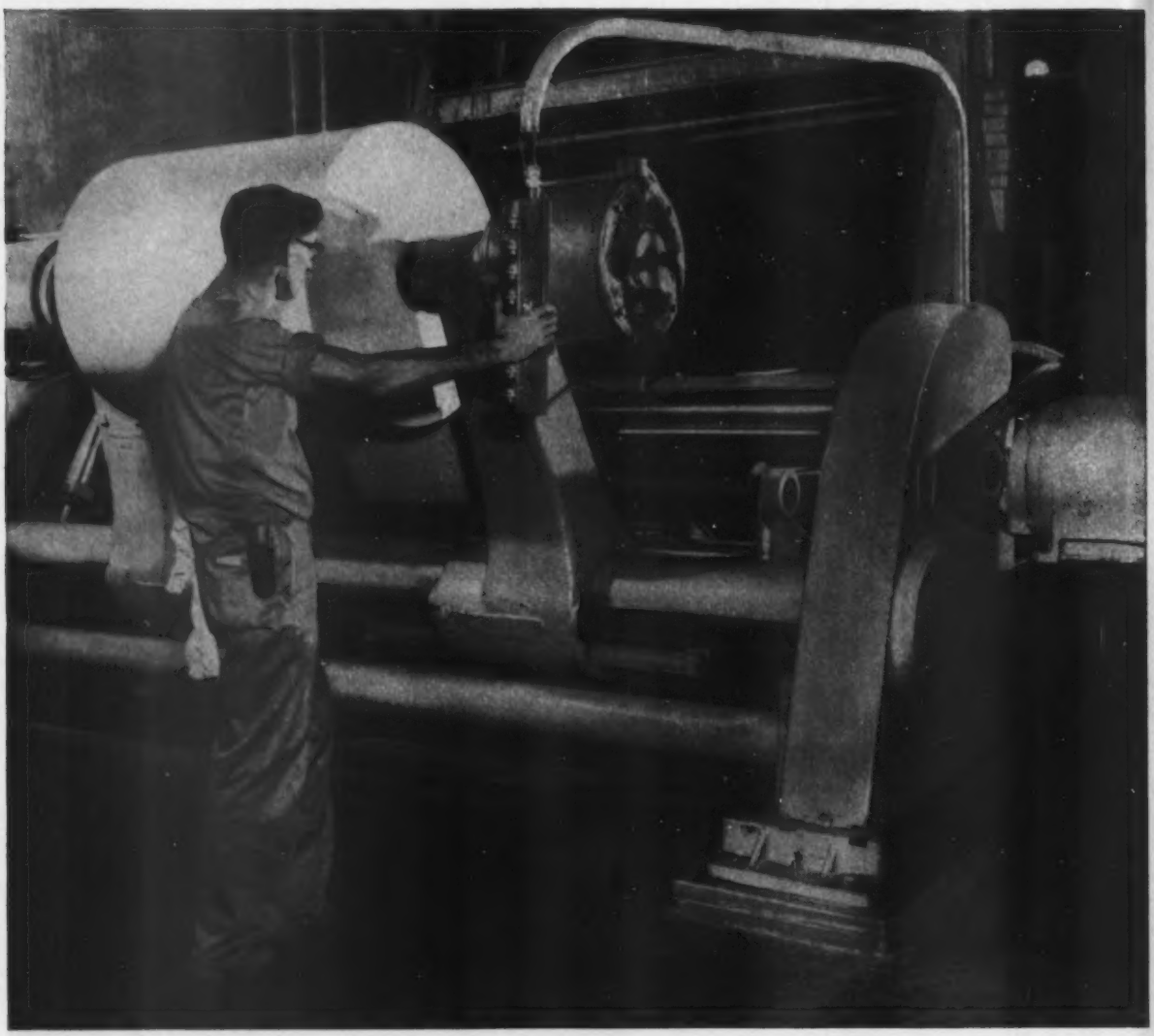

They threw out the unwind shaft and roll production jumped 50%

This is the magic of the Langston shaftless unwind stand. Put it in anywhere and right away you can get more production—and with actually less manpower.

Usually one operator can do everything—faster than two men with a shaft-type back stand. At Potlatch Forests, Inc., Lewiston, Idaho, for example, the operator can get a roll on the machine ready to unwind in about 60 seconds. All he does is maneuver the roll into position, push a button that closes the arms, another button to lift the roll into running position . . . and the job is done. No horsing a heavy shaft. No uncertain manual tightening of cones. No risk of slippage. Powerful hydraulic cylinders close the cones tight on the roll and hold them there automatically. He doesn't have to return rolls to the "broke beater" merely because of damaged cores or slow down the machine when unwinding out-of-round or narrow rolls.

Langston shaftless unwind stands can pick up rolls in diameters as small as 14 in. and as large as 84 in.—as narrow as 10 in. and as wide as 132 in. or more. Side register control, an optional extra, lets you unwind slipped (telescoped) rolls with a minimum of trim.

Economy is the big reason for today's trend toward these Langston shaftless unwind stands. Does economy interest you? Write for complete details. Samuel M. Langston Co., 6th & Jefferson Sts., Camden 4, N.J.

Langston LEADERSHIP . . . BY DESIGN

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Warren B. Bullock

Over-expansion tendency —1960 imports broke record

Grow through research

"When top management people consider expansion, consider that perhaps they are not that much smarter or better then their competitors. There's no certainty that one can get someone else's market. He's awake too and will fight back."

That clause from a financial expert's talk to the New York Paper Salesmen's Association accompanied his statement that the industry has an innate over-expansion tendency. Lawrence K. Gesner, a senior market analyst for Smith, Barney & Co., said that in general, the paper industry is in a fortunate position with self-replenishing raw material and stability in labor relations, but with all these and other favorable factors the industry's earnings record is quite poor. In ten years, he said, total net profits have grown at a rate of only eight-tenths of one per cent annually. Research was one of the requirements he saw as a means of developing the industry's inherent growth possibilities.

1960 imports

At a time when international conferences are underway, with a view toward reciprocal tariff rate reductions, statistics for 1960 indicate that imports in that year (exclusive of duty-free newsprint) broke all records on a tonnage measurement. Imports of all dutiable papers and paperboards reached a total of 316,202 tons, of which printing papers constituted 53,117 tons; coarse papers 65,888 tons; paperboard 36,352 tons; and construction paper and boards 106,401 tons. The previous high was in 1956 — 5,836,309 tons, of which 5,569,639 tons was in duty-free newsprint, leaving a balance of 266,770 tons of all other papers and paperboards.

The target figure in the Gatt negotiations as reported to be the objective of the United States Government is an average 20 per cent reduction in rates, contingent largely on the willingness of European nations, including the two Customs Unions, to grant comparable concessions in their duty rates.

The Washington administration has decided to allow increased participation by non-governmental representatives in the United States delegation, with twelve public advisors named by the State Department to serve as members of the delegation. Morris C. Dobrow, executive secretary of the Writing Paper Manufacturers Association, has been named as one of this non-government group. Mr. Dobrow was the recent recipient of the New York University Madden Memorial Award, given to the University's commerce department alumi "whose careers have exemplified outstanding achievement in business, industry or professional life".

Recent export developments

North American pulp for export has featured two recent developments. The International Cooperation Administration is looking for bids for 7,800 tons of groundwood pulp for South Korea, to an estimated value of $800,000. The Columbia Cellulose Co., a subsidiary of the American controlled Celanese Corp., is sharing in a $1,000,000 order for pulp for Cuba. Also participating in the order is the MacMillan, Bloedel & Powell River Co. of Canada. The United States has embargoed all exports to Cuba except medicine and food, so this acceptance of an order from Castro is equally touchy with the Canadian sale of wheat to Red China.

Net incomes

West Virginia Pulp & Paper Co. — Income for the three months ended April 30 to $1,681,000 from last year's net of $3,597,000. Sales dropped proportionately less, to $61,492,000 as against the previous year's figure of $63,715,000. The continued cost price squeeze was given as the cause.

Champion Paper & Fibre Co. — Income for the fiscal year ended March 31 dropped to $9,305,175; a year ago, $13,017,755.

Celotex Corp. — For six months ended April 30, $1,041,573; a year ago, $306,198.

Whippany Paper Board Co. — For six months ended March 31, $961,890; a year ago, $905,897.

Kimberly-Clark Corp. — Reporting on earnings for the fiscal year ended April 30, President John R. Kimberly said that with detailed figures not completed, net income was about 4 per cent below the profit of the preceding year, while sales were about 2 per cent higher.

United Board & Carton Corp. — Income for 36 weeks ended February 5, $52,384; a year ago, $175,520.

Union Bag-Camp Paper Corp. — First quarter, $3,931,965; a year ago, $4,083,053.

Riegel Paper Corp. — For 13 weeks ended April 2, $622,203; a year ago, $837,392.

MacAndrews & Forbes Co. — Net income for 1960, $750,489; a year ago, $754,460.

Mead Corp. — First quarter, $2,474,782; a year ago, $2,982,147.

Scott Paper Co. — First quarter, $6,586,224; a year ago, $6,576,610. Sales dipped to $79,418,961 from last year's $80,213,247.

S. D. Warren Co. — First quarter, $1,510,000; a year ago, $1,237,000.

Keyes Fibre Co. — First quarter, $428,566; a year ago, $436,106.

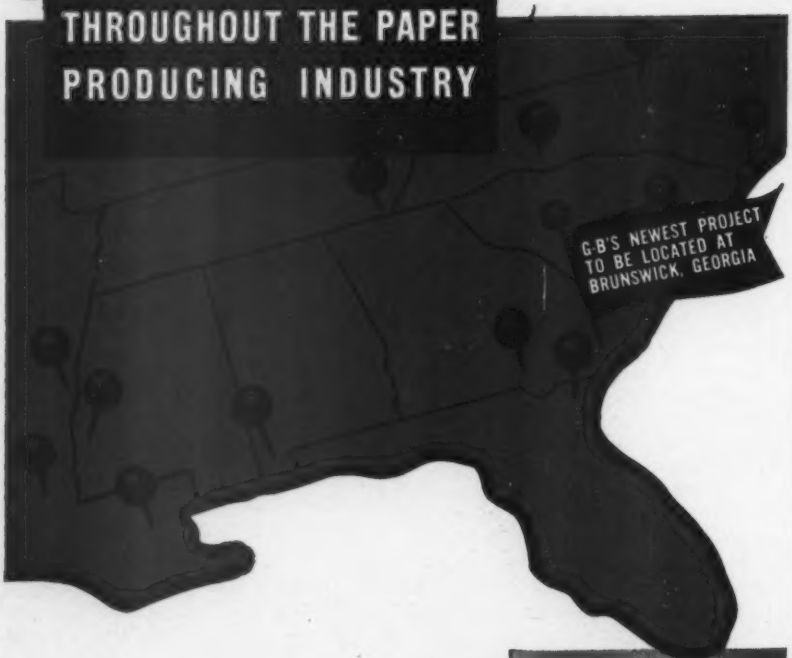
Fibreboard Paper Products Corp. — First quarter, $116,203; a year ago, $409,432.

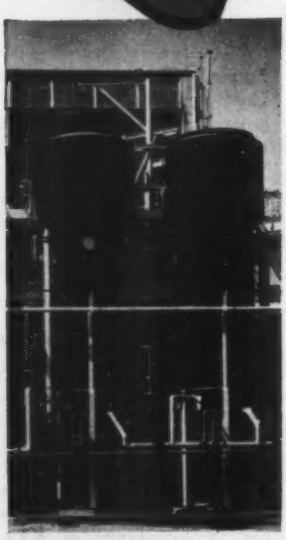
International Paper Co. — First quarter, $15,842,266; a year ago, $18,275,822. Sales dropped to $246,686,104 from the year ago total of $255,799,873.

Continued on page 248

BLACK LIQUOR EVAPORATORS STAND OUT

THROUGHOUT THE PAPER PRODUCING INDUSTRY





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FILTERS • EVAPORATORS • PROCESS EQUIPMENT • CONTRACT MANUFACTURING including HEAVY CASTINGS

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CURRENT COMMENTS

Continued from page 247

Paterson Parchment Paper Co. — March quarter, $103,028; a year ago, $97,807.

Standard Packaging Corp. — Income for 12 weeks ended March 26, $825,640; a year ago, $1,035,383.

Lily Tulip Cup Co. — First quarter, $1,367,845; a year ago, $1,459,402.

Great Northern Paper Co. — Income for 12 weeks March 31, $845,418; a year ago, $709,286.

Financial report

Price changes in securities markets remained generally unchanged during late May and early June. Changes were as a rule, confined to low fractions.

Stock and Bond Quotations

New York Stock Exchange

Closing Prices	June 9, 1961	May 10, 1961
American Can	40¾	40⅞
Same Pref.	38	37¾
Celotex	28¼	28⅛
Same Pref.	19	18⅝
Certain-Teed	58¾	57¾
Champion P & F Co.	32¾	30⅛
Same Pref.	92⅛	* 91½-92½
Chesapeake of Va.	39¼	37¾
Container	27⅝	28⅛
Same Pref.	* 88¼-88½	* 83-84
Continental Can	41⅜	40
Same Pref.	* 84¼-85¼	* 85-86
Crown Zellerbach	59¼	58¾
Same Pref.	94½	92¼
Diamond National	46¾	45¾
Same Pref.	31½	31⅛
Federal Paperboard	38¼	36⅝
Same Pref.	* 23-23¾	* 23-23⅛
Fibre Paper Board	33¼	30
Great Northern	62	63
Hammermill	31	30¾
International	33⅛	32¼
Same Pref.	* 94¼-95¼	* 95¼-96
Kimberly-Clark	83½	83½
KVP Sutherland	37⅛	34
McAndrews & Forbes	* 34¼-35	34
Masonite	31⅝	31⅜
Mead Corp.	40¼	38½
Same Pref.	* 92-92½	* 90½-92½
Minn. & Ont.	32	31½
Nat. Vulc. Fib.	25	24⅞
Oxford Paper	32½	33½
Same Pref.	* 94-95	94
Rayonier	21¼	20⅞
Riegel Paper	35⅝	33⅞
St. Regis	38	35⅜
Same Pref.	98	97
Scott Paper	110¾	114
Same $4 Pref.	* 95-96	95
Same $3.40 Pref.	77½	80¾
Sealright	39	39½
Standard Packaging	24⅜	24
Same $1.60 Pref.	75	70-79
Same $1.20 Pref.	25¾	30⅛
Same 6% Pref.	30¼	29¼
Union Bag-Camp	39¾	38½
United Bd & Cart	23	25½
U. S. Gypsum	101½	98
Same Pref.	*153-155	*154½-156
West Va. P & P	38	37⅜
Same Pref.	* 96-96½	*100¼-101½

New York Stock Exchange — Bonds

Champion P&F Co. 4½%	113	112¾
Champion P&F Co. 3¾%	93⅛	87
Diamond Gardner 4%	92	—
Kimberly-Clark 3¾%	91¾	92¼
Oxford 4¾%	115½	116
Scott 3%	141	145¾

American Stock Exchange — Stocks

Allied Paper	15⅛	13¾
American Writing	33½	34
Brown Co.	14-5/9	14¾
Puget Sound	23⅛	22¼

*Closing Bid and Asked Prices

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Personalized service is available from Sonoco plants coast to coast!

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Paper Converting MACHINE COMPANY
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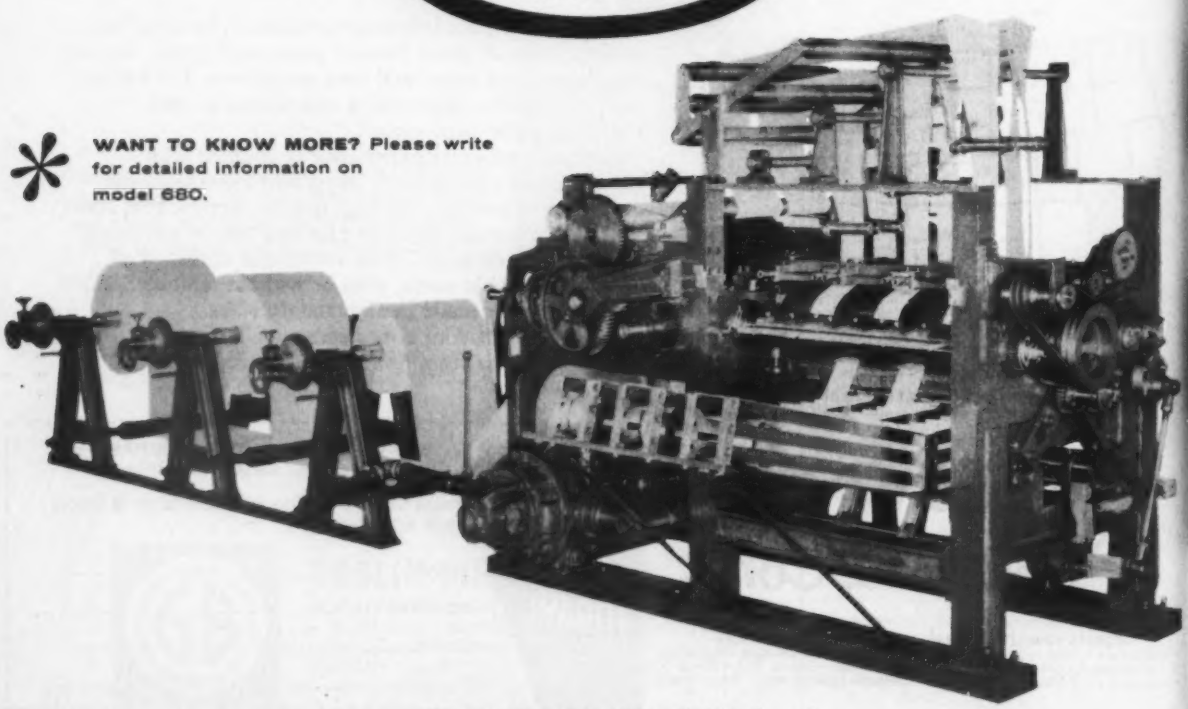

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PHOTOGRAPHY BY GEORGE NORDHAUSEN

Checkmate forest fires

Fires ravage about five million acres woodland and range annually in the United States. Prevention is everybody's job!

Weyerhaeuser Company

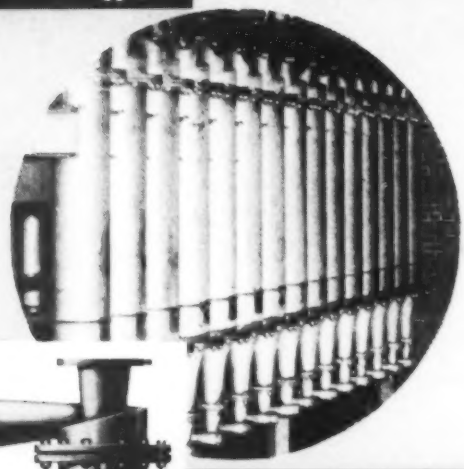
Pulp and Paperboard Division

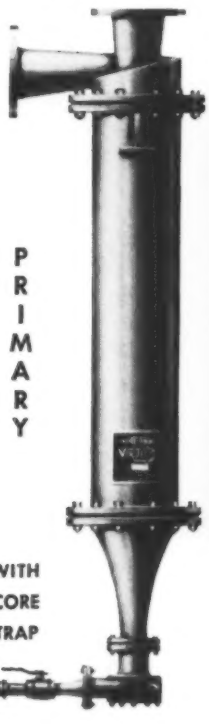
1961

NICHOLS FREEMAN

VORJECT

The Versatile Stock Cleaner





PRIMARY

WITH CORE TRAP

No air insuction

Positive-uniform rejects

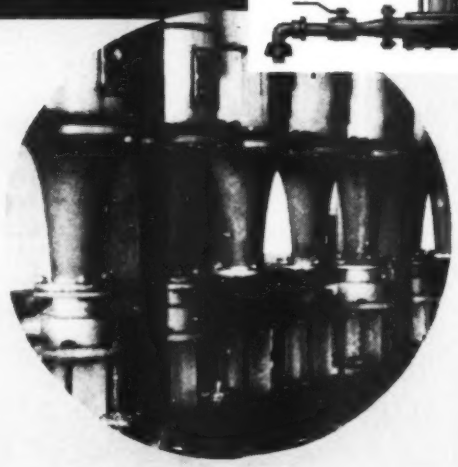
Quick-easy change of orifice

Controlled fibre losses

Flexible control with elutriation — lowest fibre loss

SECONDARY

WITH ELUTRIATOR



VORJECT—the versatile stock cleaner with built-in economies. For effective and economical cleaning of *all* types of paper stock. Sizes available from 100 to 675 GPM. Put Nichols' stock cleaning experience to work for you. Write now for further information.

NICHOLS

NICHOLS ENGINEERING & RESEARCH CORP.

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INDIANAPOLIS SAN FRANCISCO MONTREAL

For more data circle 121 on Post Card

Five-Hundredth Member Graduates from Huyck Workshop

George Stull, production supervisor of Riegel Paper Co.'s Hughesville Mill, Riegelsville, N.J. was honored as the 500th member of the papermaking industry to graduate from the Huyck Felt Co.'s Workshop at Rensselaer, N.Y.

Stull was a student in the 22nd Workshop conducted from April 12 through April 14, 1961.

This is the fifth year in which the series has been conducted. The purpose of the Workshop is to provide an organized forum in which those persons working in the papermaking industry may be brought up to date on the many new developments in the manufacture of papermaker felts and felt technology. The success of this program is attested by the fact that even though four separate workshop sessions were scheduled for 1961, the demand for enrollment has been so great that Huyck Felt is considering an extra session to be held this autumn.

Left to right are: Frederic A. Soderberg, general manager of Huyck Felt Co.; George Stull, production supervisor of Riegel Paper Co.; and Paul G. Mansuy, sales manager for Huyck Felt Co.

Productivity Team of India to Tour Countries

The National Productivity Council, Government of India, has sponsored a Productivity Team on Paper Industry to visit important pulp and paper manufacturing units, research laboratories, converting plants and paper machinery manufacturing workshops in various countries during the current year.

The team planned to spend one week in Japan and then to Hawaii to study utilization of bagasse for paper making.

The group, composed of senior personnel associated with the paper and board industry of India, will study the following problems.

(1) Utilization of bagasse as a papermaking raw material for manufacture of writing and printing papers as well as newsprint.

(2) Manufacture of dissolving grade pulp from hardwoods and other cellulosic materials like bamboo and bagasse.

(3) Manufacture of paper and board in small scale (2/10 ton and dry capacity units).

(4) Modern developments in the field of pulping and chemical recovery.

(5) Manufacture of speciality papers of different types and study of new developments like microcreping by Clupak process.

(6) Paper conversion and production of packaging materials from paper and boards.

(7) Methods of improvement in the quality of paper and reduction in cost of production.

(8) Working of technical association of pulp and paper in other countries.

(9) Working conditions for labor and wage pattern in paper industry in other countries as compared to paper industry in India.

(10) Paper mill management and incentives in paper industry.

Spruce Bark — A Source of New Materials

Spruce bark, which up to now has been a waste product of the pulp and paper industry, shows promise of becoming a useful source of tanning materials.

Work presently being conducted at Ontario Research Foundation of Toronto, Canada, has shown that an extract from spruce bark can be used to replace the conventional vegetable tanning agents, such as Wattle or Quebracho, or mixed with them to produce better leathers.

One trial, involving 300 sq. ft. of material, produced a leather which, in the opinion of skilled industrial tanners, had a superior "break" to leather retanned with conventional materials. Another trial has indicated that the spruce bark extract can be mixed with conventional tanning agents with favourable results.

Spruce bark from the pulp and paper industries is presently burned or stockpiled. Hence, the price of the extract is kept low because of the low cost of the starting material. Ontario Research scientists have calculated that one ton of bark will yield over 500 lb. of extract.

Other possible uses for spruce bark are also being investigated by the Foundation. These include the use of spruce bark extract as a conditioner for oil-well drilling muds

and as a cheap source of phenols. The latter application is particularly interesting since some adhesives used in plywood manufacture are phenolic-based, and such use would mean that plywoods could be made wholly from lumber industry products. Both applications show promise, although further research will be required to properly evaluate these possibilities.

This research has been under the direction of W. C. Henry, director of the Foundation's Department of Biochemistry, and has been supported in part by the Defence Research Board of the Department of National Defence (Canada).

Corporation Changes

Sonoco Products Co. of Hartsville, S.C., has announced that the *Newton Paper Co. Inc.* of Holyoke, Mass., will become a division of the Sonoco company. Newton was acquired in March of 1960 and has been operated as a wholly owned subsidiary. They are manufacturers of specialty paperboard.

James E. Hooper, president of *Wm. E. Hooper & Sons Co.*, Baltimore, Md., and Thomas M. Bancroft, president of *Mount Vernon Mills Inc.*, Baltimore, Md., has announced the establishment of the *Wm. E. Hooper Sales Co.* as a division of the Mount Vernon Mills Inc. and the purchase of Wm. E. Hooper Papermakers Dryer Felt operations by Mount Vernon. *Mount Vernon Dryer Felt Co.*, a Division of Mount Vernon Mills Inc. will assume responsibility for the manufacture and sale of the Hooper Dryer Felt operations. Wm. E. Hooper Sales Co., Division of Mount Vernon Mills Inc. will handle the distribution of Hooper grey goods and finished goods. This new division, together with the present Hooper sales organization, will continue to service the trade as in the past and will maintain its present sales offices.

Tileston & Hollingsworth Co. of Boston, Mass., wholly owned subsidiary of *Penobscot Chemical Fibre Co.* of Great Works, Maine, announces the purchase of *Whiting & Co.* of Holyoke, Mass. Whiting & Co., manufacturers of of fine papers in both rag and sulfite, will be maintained and with certain exceptions, it is planned to continue the grades they now manufacture.

Foxboro Co. of Foxboro, Mass., has announced plans to acquire the assets of *Waugh Engineering Co.* of Van Nuys, Calif., manufacturers of electro-mechanical and electronic instruments. The firm will be operated as a division of Foxboro and will continue under the direction of its founder, Charles C. Waugh.

Inlander-Steindler Paper Co. has announced the acquisition of the *Kankakee Paper Co.* of Kankakee, Ill. Kankakee will continue to operate as the Kankakee Paper Co., a Division of Inlander-Steindler Paper Co. of Chicago Ill.

Chemtron Corp. of Phillipsburg, N.J., will change its name to *Pearsall Chemical Corp.* Mason Pearsall, president of the company, stated that the time is right for expanding sales to the whole broad range of chemical processing industries.

Ciba Agent

Ciba Co. Inc., of Fair Lawn, N.J., has appointed Leonard & Maxwell, New York, N.Y., to handle advertising, sales promotion, special publicity and trade relations for its three divisions: dyes, chemical specialties and pigments.

recent expansions

New Paper Tube Converter

A new company, named The Sheray Corp., has begun production in their new manufacturing plant in So. Boston, Mass. The company is a converter of paper tubes. It was stated by the company that Sheray is the first new converter in New England in 15 years and the only one with completely custom and automatic equipment to build tubes.

The company expects to solicit not only the regular tube business, but will build special machinery for new and troublesome customer applications and will concentrate on precision tubes and cores.

Sheray Corp. was formed exclusively by engineers in 1960 with an idea to manufacture tubes completely by automation.

Container Begins Production of Expanded Polystyrene

Container Corp. of America, Chicago, Ill., has announced that the company will soon begin production of expanded polystyrene for protective inner packing.

The polystyrene will be processed at Container's Mengel Division in Louisville, Ky. A molded-foam department has been established and will be managed by William J. Glower, former manager of the company's corrugated shipping container plant at Lexington, Ky.

Other personnel changes include: Ted Duerr, a former sales representative for the corrugated plant, has been named sales manager of the new department; Robert E. Guffy, manager of the Louisville corrugated plant, will also serve as manager of the Lexington plant; and W. L. Hoge Jr., sales manager for the Louisville plant, will act in the same capacity for the Lexington plant.

Bemis's Tekmold Plant Completed

Bemis Bro. Bag Co. has completed the building of its new plant at Muskegon, Mich. The company has installed production equipment for the manufacture of Tekmold molded cellulose products. Full production is anticipated by fall of this year.

J. E. Zeller, resident manager, stated that the new one-story, 50,000-sq.-ft. plant replaces facilities at Minneapolis, Minn., and should enable the company to triple its production of Tekmold products due to the new, specially engineered machinery installed.

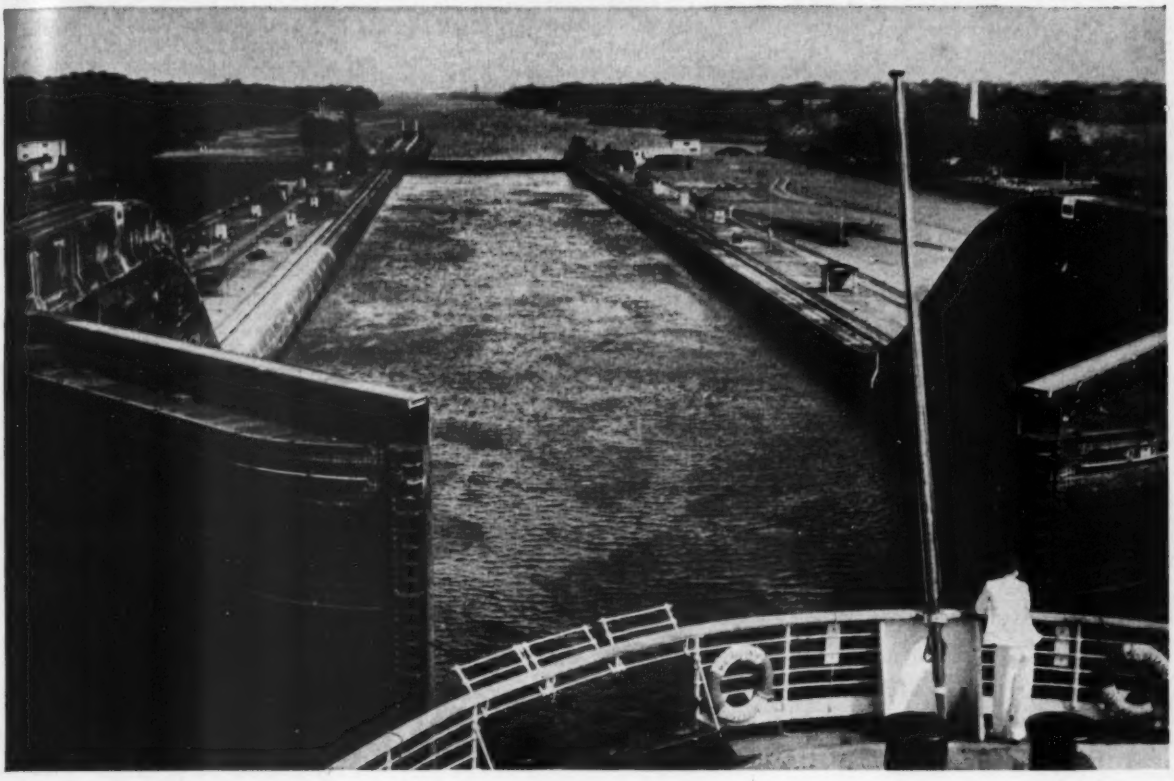
J. E. Sirrine To Build New Headquarters

J. E. Sirrine Co., engineers and architects of Greenville, S.C., have awarded construction contracts for their own new modern office building to be located near the Greenville airport.

The new building will provide 32,500 sq. ft. of air-conditioned office space in a two-story design. Total construction and site development costs are reported to be in excess of one-half million dollars. George Wrigley Jr., president of Sirrine, announced that completion is scheduled for January 1962 to coincide with the company's 60th anniversary.

Continued on page 256

*Idea submitted by John E. Cavey, Oxford Paper Co., West Carrollton, O.
Photo of Gatun Locks from the Atlantic side — from: Ewing Galloway, New York



HAM FELTZ says:

"Reminds me of HAMILTON Felts... the short cut to greater savings!"

"Both the Panama Canal and Hamilton Felts give their users operational savings.

"Hamilton Felts remove more water at the wet end of your machine, save fuel and time. Hamilton Felts also last longer, reduce costly down time. You benefit from the increased production, higher quality and greater profits that result.

"If one of our 300 modern, technically proven styles won't solve *your* needs, we'll be happy to design a Hamilton Felt that will.

Just ask your Hamilton Felts Service Salesman."

YOU CAN'T BEAT
Hamilton
FELTS

*WIN... *A NEW Shakespeare Spincast Fishing Outfit!*

"What famous place reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. Each idea from a U.S. papermaker that we use wins a new 1961 model Shakespeare Spincast Rod and Reel—FREE! When identical winning ideas are submitted by 2 or more papermakers, the one with the earliest postmark will be considered the winner. Every U.S. papermaker *entrant* receives a famous Rex Spoon fishing lure — FREE. Send me your suggestion — today.

Ham Feltz, Dept. I
612 First National Bank Bldg., Cincinnati 2, Ohio."

SHULER & BENNINGHOFEN, HAMILTON, OHIO

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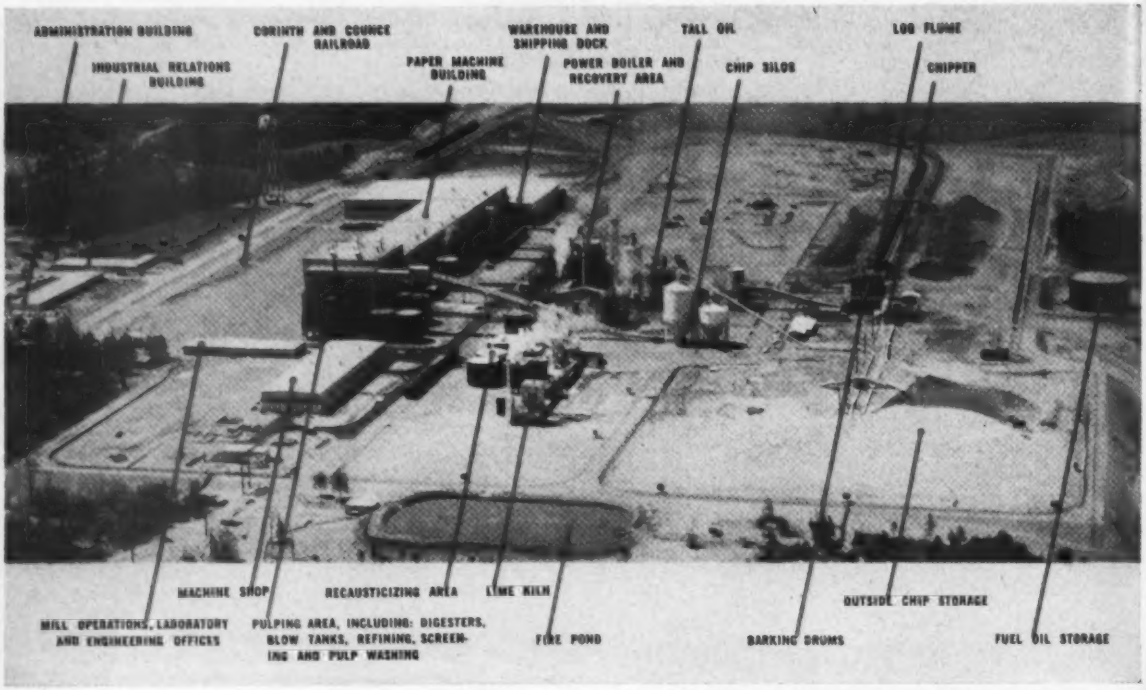


Plant layout on Tennessee River's new kraft mill in Counce, Tennessee.

Industry Officials Tour Tennessee River's New Kraft-Mill

ON JUNE 7, Tennessee River Pulp & Paper Co. welcomed over 116 industry officials into the company's new 500 ton/day kraft pulp and paper mill at Counce, Tenn. After a welcoming address from President G. W. E. Nicolson, the guests were divided into small groups for a guided plant tour. When the tour was completed, the guests boarded chartered buses which returned them to the Peabody Hotel in Memphis where the guests had been registered. Here, a program including a social hour and dinner had been planned to complete the visit.

The new mill

Built on a split-level site of some 1600 acres, the mill is located in Counce, Tenn., near the Tennessee River and is adjacent to T.V.A.'s Pickwick Hydro-electric Dam. At a cost of about $30 million, the mill took two years for construction. It was originally designed to produce 500 ton/day of kraft linerboard but future expansion is being planned. On the day of this visitation, the mill was running 600 tons.

This location will provide the mill with the following advantages:

• Unlimited supply of water from the lake formed by the Pickwick Dam — Each day, 15,000,000 gal. of water are used in the manufacturing operations.

• Reliable electric power from the T.V.A. systems — Annual requirement by the mill is 70,000,000 kilowatt hr. of electricity. This is purchased through Pickwick Electric Cooperative.

• Adequate supplies of both pine and hardwoods from the timberland in the area — Annually, 300,000 cords of wood are purchased — 85 per cent is pine and the remainder is hardwood. Annual pulpwood purchase is $6 million. The company owns 160,000 acres of timberland in Tennessee, Alabama and Mississippi, more than 50 per cent of its pulpwood needs will be purchased from small landowners in the area.

• Shipping by water on the Tennessee, Ohio and Mississippi Rivers, plus direct connection to three main railways.

• Proximity to natural gas transmission pipelines — Natural gas for fuel is purchased from the Tennes-

Wet end of the Beloit paper machine showing the primary and secondary headboxes and the 262-in.-wide fourdrinier.

see Gas Transmission Co. through the Alabama-Tennessee Gas Co.

The original concept of this mill was adhered to throughout its development. Many of the operating concepts and equipment applications used in this mill have been applied in other mills, although it is believed that this is the first plant to make use of so many unusual applications in one location. Some of these inovations which were applied are: outside storage of wood in the form of chips rather than logs; use of maximum instrumentation; outside construction of boilers, evaporaters and other equipment; hot stock refining; hot stock screening; and completely remote control of all steps in digesting refining, screening and washing.

A Beloit paper machine

The mill is operating one Beloit fourdrinier which has a 262-in. wire. This machine is equipped with both primary and secondary headboxes. The press section includes a first suction press, a second suction press

each day to operate at its present rate of production. This division is staffed with 22 technical foresters and is divided into two departments — the Wood Procurement Department which is responsible for purchasing and transporting the supply of pulpwood; and the Land Management Department which has the primary function of administering and managing the 159,347 acres of company-owned land located in the tri-state area surrounding the plant.

Personnel

Board of Directors: W. Irving Osborne Jr.; W. D. P. Carey; G. W. E. Nicholson; John L. Bell; and Wayne Young.

Executive: G. W. E. Nicholson, president; E. M. Leavitt, vice president and resident manager R. W. Estes, assistant to vice president and resident manager.

Control and Finance Division: G. O. Griffith, controller and assistant treasurer Harry D. Wilson, chief accountant and Leon G. Smith, pur-

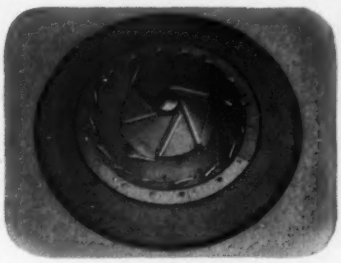
NOBLE & WOOD'S

EXTRACTA PULPER

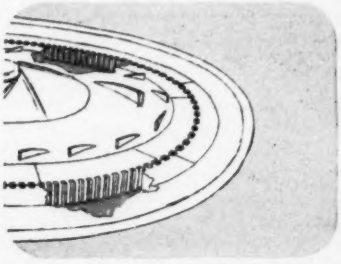
Lowers Costs

Increases Production

Improves Quality



The EXTRACTA'S ROTOR is the key to its superior performance*



*Noble & Wood engineers have incorporated, for the first time, the principle of extracting through rotating and stationary elements. This feature adds fiber selection plus primary refining to conventional pulping in one single, compact, rugged unit.

For full information on what looks like the hottest news in the paper industry, write or phone us at once. (We have an interesting color film on the EXTRACTA PULPER at work that you'd like to see.)

THE **NOBLE & WOOD MACHINE COMPANY**

Paper Mill Machinery

Hoosick Falls, New York, U.S.A.

NOBLE & WOOD ACCEPTS A NEW CHALLENGE ENTHUSIASTICALLY, LED BY A VIGOROUS NEW MANAGEMENT TEAM AND BACKED BY 67 YEARS OF SUCCESSFUL EXPERIENCE

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NEWS OF THE INDUSTRY

Continued from page 257

Dexter, wood and land manager; N. W. Sentell, assistant wood and land manager; W. W. Vickery, forest management superintendent; W. E. Gibbons, wood procurement superintendent.

Technical division: J. C. Baumgartner, technical superintendent.

Keyes Fibre Breaks Ground in Sacramento

Keyes Fibre Co. of Waterville, Maine, has broken ground in Sacramento, Calif., for the construction of the company's new multi-million-dollar pulp molding plant.

Located on a 40-acre site, the new plant has scheduled manufacturing operations to begin in mid 1962 and will manufacture molded paper products for the food industry, including plates, prepackaging meat and produce trays, food service trays, cake circles, apple packs and egg trays. It will serve the eleven western states as well as Hawaii and Alaska.

Stone Container Start-Up In Ohio

Stone Container Corp. has announced a successful start-up of the first part of the company's expanded production facilities at Coshocton, Ohio. Featured in this part of the expansion is a new Black-Clawson stock preparation system and a paper machine which is housed in its own new building and supplied by the United Paper Machinery Corp. It produces 150 tons a day of .009 semi-chemical corrugating medium.

The new stock preparation equipment in this operation includes a 20-ft. Hydrapulper, Ruffclone, Breaker Trap, three Liquid Cyclones, two Classifiners, HMSS and HM pumps, a thickener, agitators, a No. 5 Black-Clawson jordan and an automatic continuous pulper for broke handling.

Next in line for Stone Container is the start-up of the new pulp mill which will utilize Black-Clawson's ChemPreg Cold Soda System. This system will process Ohio hardwoods to produce 150 tons of pulp a day for corrugating medium. Pulp production is scheduled to start in the early summer.

Fritzsching

Cowell

Penick & Ford Ltd.

Peter R. Fritzsching has been appointed paper mill representative for this company. Fritzsching will call on paper mills and convertors in the Middle Atlantic district.

Ernest C. "Bud" Cowell has also been appointed paper mill representative. Cowell will cover paper mills in the Central district.

Weyerhaeuser Co.

Howard W. Morgan has been awarded an honorary doctor of science degree by New York State College of Forestry, Syracuse, N.Y. Morgan is a director of Weyerhaeuser and vice president of its pulp, paperboard and container group.

Howard L. Simmons has been appointed to the newly-created position of vice president — manager of the company's shipping container division. He will maintain offices in Chicago.

William A. Wurster has been appointed vice president of the shipping container division's western region.

Dr. J. D. Reagh Jr. has been appointed research director of the company's pulp and paperboard division. He succeeds Dr. Harold Bialkowsky, who resigned.

Oxford Paper Co.

David J. Kraske has been promoted to the position of coating superintendent of the company's Lawrence, Mass., Division. Kraske joined the Oxford Research Organization in 1959 as assistant group leader of the coating group, and in 1960 he was promoted to research scientist.

Henry

Ibarguen

Link-Belt Co.

Robert R. Henry, formerly sales manager for the company's southwestern division, has been appointed district manager for the Detroit territory to succeed George A. Paige, who is retiring. Henry was formerly in charge of the Houston area.

Raymond A. Ibarguen succeeds Henry as district manager of the Houston territory. He has been a district engineer in the Houston sales office since 1952.

Columbia Box Board Mills Inc.

Joseph P. Vinck has been promoted from division administrator to general manager of the Walloomsac Division, N.Y. Vinck's new duties will make him completely responsible for all personnel assigned to his division as well as the function of general administration.

Wendell Croyle has been promoted from tour boss to superintendent of the Walloomsac Division. He will assume the responsibility of papermaking machine operations, maintenance, shipping, receiving,

Continued on page 260

Miami University

As Miami University at Oxford, O., graduated the first class of its industry-sponsored paper technology program, first of its kind in Ohio, an honorary Doctor of Laws degree was conferred upon Howard E. Whitaker, Mead Corp. chairman who has headed both the industry advisory committee for the program and the foundation through which industry now helps support it. Shown here on that occasion (left to right); John Swafford of Oxford and James R. Weber, Brookville, O., who among the program's first seven graduates have been accepted by the Institute for Paper Chemistry at Appleton; Mr. Whitaker, who also is president of the A.P.P.A., and C. Edwin Brandon, director of the Miami program.

IT MATTERS LITTLE

HOW SOME TUBES ARE MADE

...but Quality is a Factor in Most Cases

One of the least expensive components of rolled products in the paper and textile fields–tubes and cores–naturally gets the least attention.

Yet the precision and quality of the tubes or cores vitally affect the end product, in sales and repeat orders.

TPP Tubes and Cores are precision-made at five of our own modern plants. Raw materials are drawn from an unlimited number of sources to meet exacting requirements. Even the glue is aged with the care of fine wine to assure adhesive characteristics to meet TPP standards.

Couple TPP quality with unequalled service from 5 plants by our own trucks and you have the best buy of all in tubes and cores.

TPP TEXTILE PAPER PRODUCTS inc.

Specialists in tubes and cores for textile and paper industries

CEDARTOWN, GEORGIA Home Office and Plant
Other Plants In: Carlyle, Illinois — Crossett, Arkansas
Jacksonville, Florida — Mobile, Alabama

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NAMES IN THE NEWS

Continued from page 259

and all departments directly connected to mill operations, as well as all personnel assigned to the equipment, machinery and supplies departments.

Fraser Companies Ltd.

A. M. Harper has been appointed mill manager of the Atholville pulp mill of Fraser Companies, Ltd., Edmundston, N. B. In the past, Harper has held several similar mill positions, including mill superintendent at Atholville.

Harper

Max

Continental Can Co.

Dr. Keith W. Max will assume the newly-created position of director of research and development for the containerboard and kraft paper division of Continental Can. Max and his staff will be located in the company's new bleached board mill at Augusta, Ga.

Lodding Engineering Corp.

Dr. George E. Soyka has been appointed exclusive sales agent for Mexico and Latin America by this company of Auburn, Mass. Soyka will handle sales of Lodding products through his affiliation with Manuel Del Castillo. For the past two years, Soyka has headed a pulp and paper industry consulting firm.

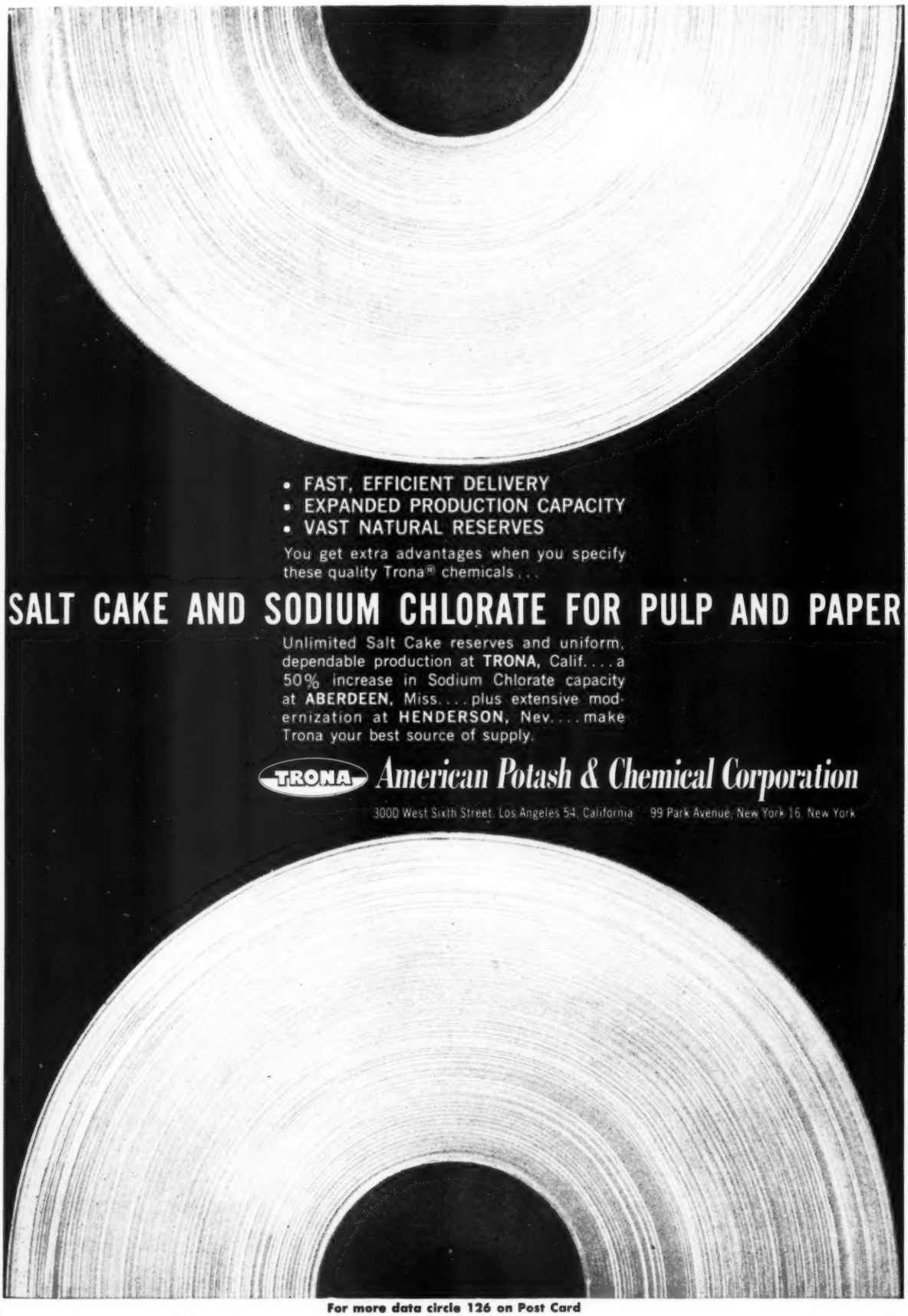
International Paper Co.

Albert Oetkin has been named assistant manager of the company's Hudson River Mill at Corinth, N.Y. Oetkin replaces Judson Hannigan who was named manager of the mill earlier this year on the retirement of O. B. Beyer.

C. A. Nobles, production superintendent of the Georgetown, S.C.,

Continued on page 280

Les Hall


• FAST, EFFICIENT DELIVERY
• EXPANDED PRODUCTION CAPACITY
• VAST NATURAL RESERVES
You get extra advantages when you specify these quality Trona® chemicals . . .
SALT CAKE AND SODIUM CHLORATE FOR PULP AND PAPER
Unlimited Salt Cake reserves and uniform, dependable production at TRONA, Calif. . . . a 50% increase in Sodium Chlorate capacity at ABERDEEN, Miss. . . . plus extensive modernization at HENDERSON, Nev. . . . make Trona your best source of supply.
TRONA
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99 Park Avenue, New York 16, New York

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TD-12 Slitter-Winders

Increase Production at Standard Paper Manufacturing Co.

STANDARD PAPER MANUFACTURING CO.

RICHMOND, VIRGINIA, U. S. A.

Nov. 30, 1960

Mr. F.T. Peterson, President
The Black-Clawson Company
250 Park Avenue
New York 17, N. Y.

Dear Mr. Peterson:

We have recently put into operation two Black-Clawson winders on our #2 and #3 paper machines.

We are entirely satisfied with the performance of these winders and are pleased to report, as a result of more uniform rolls, production has been increased. We have also noticed a substantial reduction in broke throughout the entire finishing operation.

We would like to express our appreciation for the prompt delivery of these units, which were installed by your engineering staff in the shortest possible time.

Sincerely,

STANDARD PAPER MANUFACTURING COMPANY

Howard S. Donald
President

HSD/hd

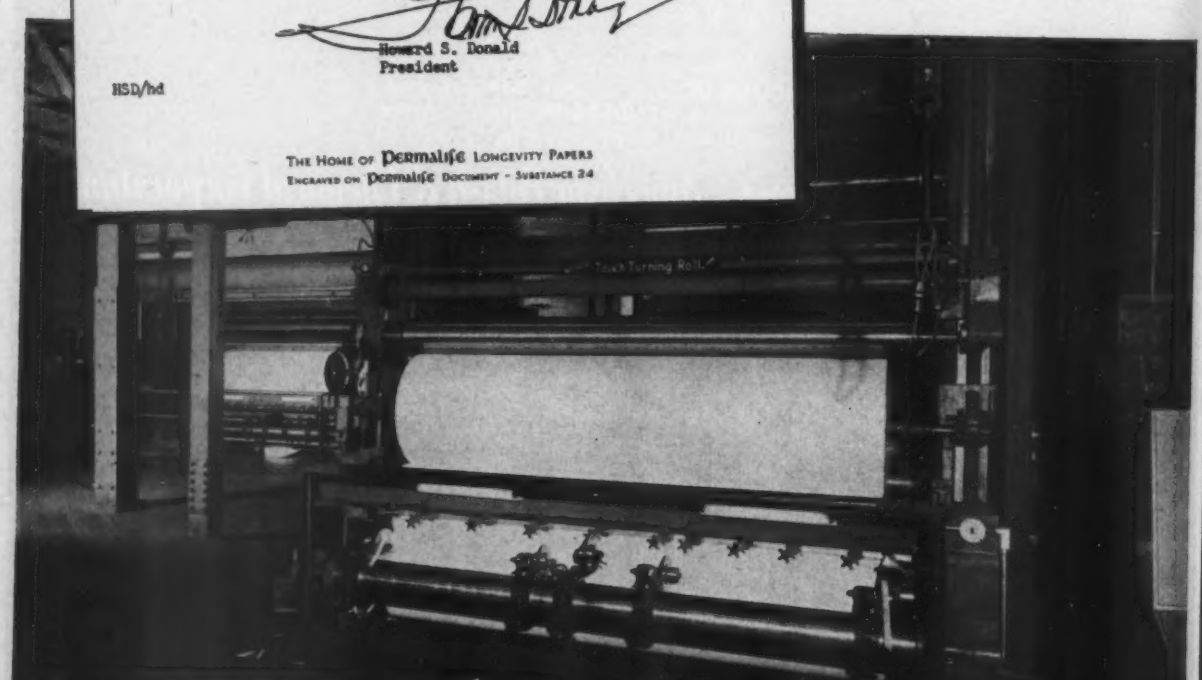
THE HOME OF Permalife LONGEVITY PAPERS
ENGRAVED ON Permalife DOCUMENT - SUBSTANCE 24

These two TD-12 Slitter-Winders are proving their value daily at Standard Paper Manufacturing Company, manufacturers of a wide variety of specialty items, plain and coated blotting paper, offset book, text, writing, mimeo, ledger index, cover, greeting card, filter and impregnating papers.

Both are shear cut units utilizing dual shift front shear support, tooth belt main drive, rear shear drive and Black-Clawson's patented air-operated automatic riding roll pressure relief.

More uniform rolls and less broke such as Standard Paper Manufacturing Co. has experienced are advantages every mill would like to have. Because of superior design features, Black-Clawson TD Slitter-Winders provide them every time.

Perhaps you too can benefit from improved slitting and rewinding. Why not look into it. Get in touch with Dilts Division, Fulton, N. Y. LYric 2-4265.



DILTS DIVISION
Fulton, New York
CONVERT WITH CONFIDENCE

BLACK-CLAWSON

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Flocculation during sedimentation

This is one of a series of studies on flocculation carried out by the Swedish Forest Products Laboratory at Stockholm. It is based on the application of the Smoluchowski coagulation equation (cf. **Zeitschrift physik. Chem. 92,** 137 (1916)) and the treatment is in part mathematical. In a suspension of sedimenting particles of differing sizes, the particles approach each other because of varying rates of sedimenta-

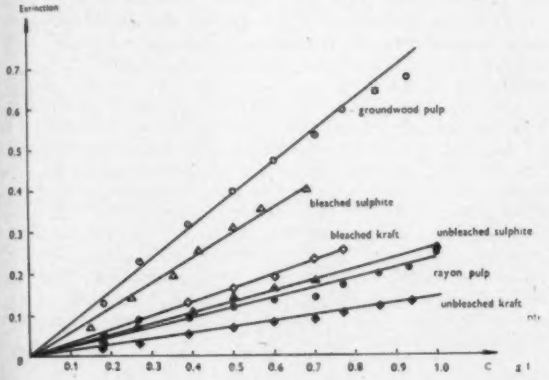


Figure 1

tion. As indicated by earlier theories of the relative motion of particle pairs, hydrodynamic repulsion will cause a significant reduction in agglomeration, within the area of "creeping motion" Reynolds numbers. Besides their hydrodynamic properties, the determining factors which affect particle agglomeration include the geometry of the particles and the nature of their surfaces. Under certain conditions, in the initial stages of sedimentation, the conditions of agglomeration could be described by the Smoluchowski equation for colloidal particles (due to Brownian motion). Tests of the validity of the equation were made experimentally by using papermaking fibers (Fig. 1), which were settling in water-glycerol mixtures. The effects of particle concentration, particle size, density and the viscosity of the suspending liquid were all studied, and these appeared to influence the rate of agglomeration in accordance with the equation. The states of the agglomeration in these experiments were measured by direct count of the agglomerates, and by determining the optical non-uniformity of the suspensions. Figure 1 shows the linear relationship between extinction and concentration (in grams per liter) for various pulps. The slope of the extinction line may be used in calculating the specific extinction coefficient of the various pulps.

Nineteen references. Olle Andersson. **Svensk Papperstidn. 64,** 248-61 (1961) (In English.)

Fresh water savings in papermachine operation

The authors discuss savings that can be effected in the use of fresh water by substituting either (or both) clarified and unclarified backwater. This is not only an economic problem, but also has certain legal aspects, where the backwaters may be subject to contaminants. The machines alluded to, manufactured printing papers, writing paper, parchmentized paper and wrappings, and those areas in which savings were effected have been tabulated together with the percentage of fresh water that could be saved by the use of backwater. Schematic drawings are given showing old and new installations in which such savings were effected. In sprays used on the machine wires, at times 25-37 per cent fresh water could be saved, and in sprays or showers connected with the knotters, such savings varied from 10 to 23 per cent. Other possible savings are discussed, and their practicability described briefly.

Ferdinand Wultsch and Karl Meier **Das Papier 15,** 130-34 (1961) (In German with brief English summary).

A determination of the yellow tone of pulps and rayon

The yellow color of a pulp or a rayon that was quite independent of the gray tone in the sample, could be determined in the "Elrepho" apparatus, by noting the percentage increase in the red-yellow-green spectral range (i.e. 50 per cent of the white), with concomitant loss in the green-blue-purple range (also 50 per cent of the white). The amount of yellow in a pulp (termed G_1) and in a rayon produced from such a pulp (G_2) are given as possible examples. The value G_2 minus G_1 is termed the "yellowing" of the rayon. Model tests were made, and in order to obtain a certain degree of grayness, white pigments and salts were rendered "transparent" by the use of a paraffin oil. Then in order to get a certain yellow tone and/or a combined yellow-gray tone, mixtures of white and yellow pigments were used. The yellow color was provided by suitable chromate-bichromate mixtures and the graying was achieved by using coarse sodium sulfate or (to a lesser extent) calcium carbonate and examining them both before and after oil treatment. Actually the gray tone developed in rayon when this was rendered transparent, and the yellow tone of pulps was also greatly increased when this was rendered transparent by means of paraffin oil. Thus a good part of the yellowing that takes place when rayon is produced from a dissolving pulp (and develops a certain transparency) is primarily an optical effect.

7 references. Richard Stahn. **Das Papier 15,** No 1, 1-5 (1961) (In German, with Engl. and French summaries).

Unbleached sulfite pulp for greaseproof papers

In 1951 Brecht and Klemm (**Das Papier 6,** 489-503) developed the so-called E-values for the rapid evaluation of groundwood pulps. This was now adapted to chemical pulps, in an attempt to develop a laboratory technique by means of which it would be possible to determine the suitability of an unbleached sulfite pulp for manufacturing greaseproof papers. The factors examined were drainage, the degree of greaseproofing obtainable, the initial web strength, and the adherence of the sheet to the machine wire. These are properties that primarily affect papermachine output as well as the quality of the product. In the method, derived from the Brecht-Klemm procedure, water was removed from the stock, under vacuum in a sheet mould, and from the data obtained it was possible to calculate the drainability, and, from this and the sheet properties, to determine the so-called characteristic drainage values E_W (obtained in the absence of air) and E_L (with the passage of air) (suggested by Brecht and Klemm). Experimentally this was done with a mould modified so as to permit the use of greaseproof pulps. Another (new) value J_S was also developed; this shows what percentage of initial wet strength constituted the tensile strength required in transferring the paper web from the suction couch to the first press. This value is determined from the initial wet strength, the "attachment to the wire" and the so-called "J line". Experimentally, the latter was obtained by measurements (on the papermachine used in making the greaseproof product) of the apparent elongation, and the

total tensile strength, and of the attachment of the stock. Is should show the ability of the web to be transferred from couch to the press without breaks—and apparently this serves better than do wet strength measurements alone. The attachment of the stock to the wire is determined with the aid of a small additional apparatus on the sheet mould, and for the initial wet-strength measurements, a new "wet strength-stretch recording tester" was also devised. Statistical methods were then used to determine how the above values (determined in the laboratory) compared with the actual corresponding papermachine values. It was found that a significant correlation exists. This was especially true for the E_W values which give a very satisfactory indication of the drainage properties of the stock. Although the method has not been developed completely, it is already possible to get a clear indication of the factors that distinguish greaseproof pulp properties. Twenty references and 11 figures. R. Angervuori and A. Kenetti. **Paperi ja Puu** (Finland) **43**, 83-92 (1961) (Original in Finnish with English summary).

Tinting in offset printing papers

Tinting is caused by the receptivity of ink in the non-printing areas of offset plates. J. A. Bitter (Inst. Graphic Arts of Holland, **Publication No. 13**, 1958) explained tinting as being caused by surface active agents in the paper. Decreases in surface tension lead to the possibility of tinting. The present author's comprehensive experimental study was carried out at the Institute of Graphic Arts in Leipsic. He shows that colloidal substances in the paper sheet may also cause decreases in the surface tension, but that these substances are also capable of absorbing surface active agents and of rendering them harmless. Apparently, the action of paper in the tinting on offset plates is due to the fact that such colloids may be dissolved out (especially from the paper coatings), or that they are liberated in very finely dispersed form. In the latter case they serve to stabilize the ever-present emulsions formed between the water and the ink. Components that may cause tinting include dissolved casein, solid fibers, and fillers removed from the sheet. The following have been studied: (a) the surface tension of wetting agents at various concentrations; (b) the reciprocal action of starch solutions and a wetting agent; (c) the interaction of an aqueous extract from the paper with starch; (d) the reciprocal effects of such a paper extract with solutions of a wetting agent; (e) a critical enquiry into the causes of tinting. There was no apparent correlation between interfacial tension and tinting tendencies. Interfacial tension appears to increase as the pH drops, but there is no proportionality in this relationship. The tests used are described fully, and some of them are based on Bitter's techniques.

Emil Rupp. **Das Papier 15**, 93-98 (1961) (In German with brief English and French summaries).

Mold growth on corrugated board

Certain complaints regarding fungal attack on corrugated shipping containers, (serving in the transport of canned foods) were investigated. The studies that followed involved twelve fungi belonging to the genera **Aspergillus, Penicillium, Trichoderma, Sporotrichum, Fusarium,** and **Paecilomyces,** all of which had been isolated from damaged overseas containers. Some of these types grew both on the medium and on the liner, over wide ranges of humidity and temperature. On the other hand the growth was far more extensive on the liner than on the fluted medium, and this supported the view that contamination of these cartons occurred **after** manufacture, during handling and transportation rather than during the corrugating and converting operations. The adhesive used in corrugating was shown to be insufficient to serve as nutrient for the fungi involved in the attack.

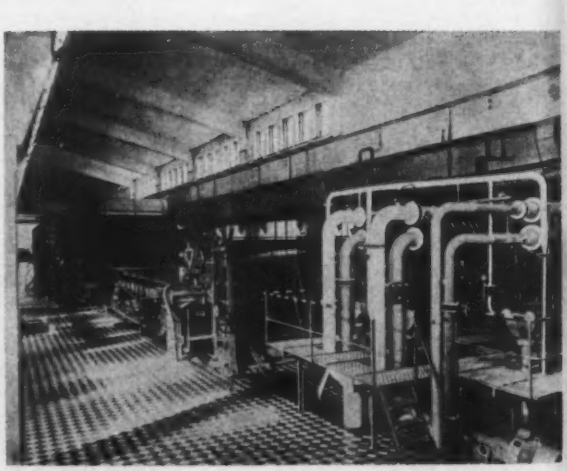
Seeichi Nasuno and Tosinobu Asai. **J. Japanese Tech. Assoc. Pulp and Paper Ind. 14**, No. 10, 683-90 (Oct. 1960) (Original in Japanese with English summary); through **Abstr. Bull. Inst. Paper Chem. 31**, 940 (1961).

The Finnish Pulp and Paper Industry in 1960

Photo at left is a general view of the Warkaus Mills of A. Ahlstrom Osakeyhtio. Photo below shows the rebuilt papermachine "Y" of the Mantta Mill of G. A. Serlachius Oy.

This unusually comprehensive, illustrated article gives the developments in the various wood using industries of Finland, and includes detailed accounts of improvements in the mechanical and chemical pulp industries, the paper industry and the board and wallboard industries. The article contains over sixty half-tones, of which only two are included here. In groundwood, 988,000 tons were produced. Of this 197,000 tons were sold as such, and 690,000 entered the paper industry; 94,000 tons were used in board manufacture and 199,000 tons went into wall board manufacture. The total Finnish chemical pulp production was 2,466,000 tons and a new peak in export was reached. Over 1,400,000 tons were exported. Although kraft pulp exports decreased somewhat, that of sulfite pulp increased significantly. There was also a marked increase in the export of paper, with Western Germany and the United States as the principal buyers. The total 1960 paper production was over 1,450,000 tons. In every section of the report, improvements and developments in individual mills are described in adequate detail, often with complete illustrations. All descriptions are in English.

Anon. **Paperi ja Puu** (Finland), **43** Special No. 4a, 125-154 (1961).



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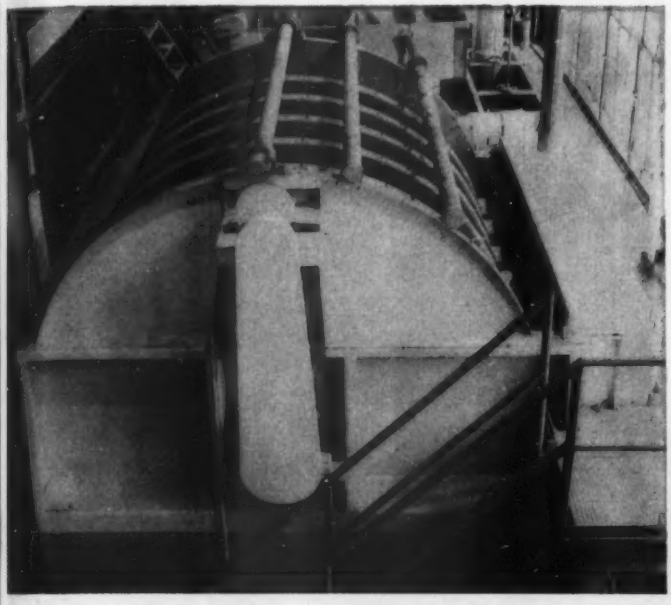

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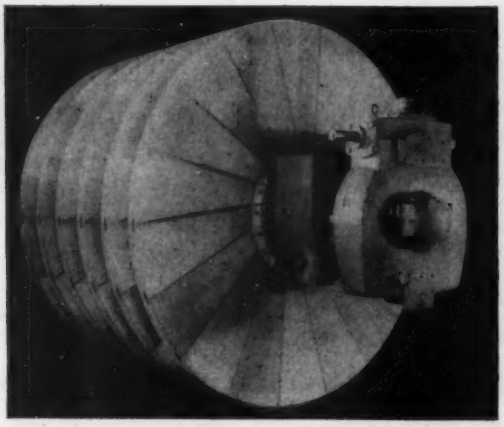

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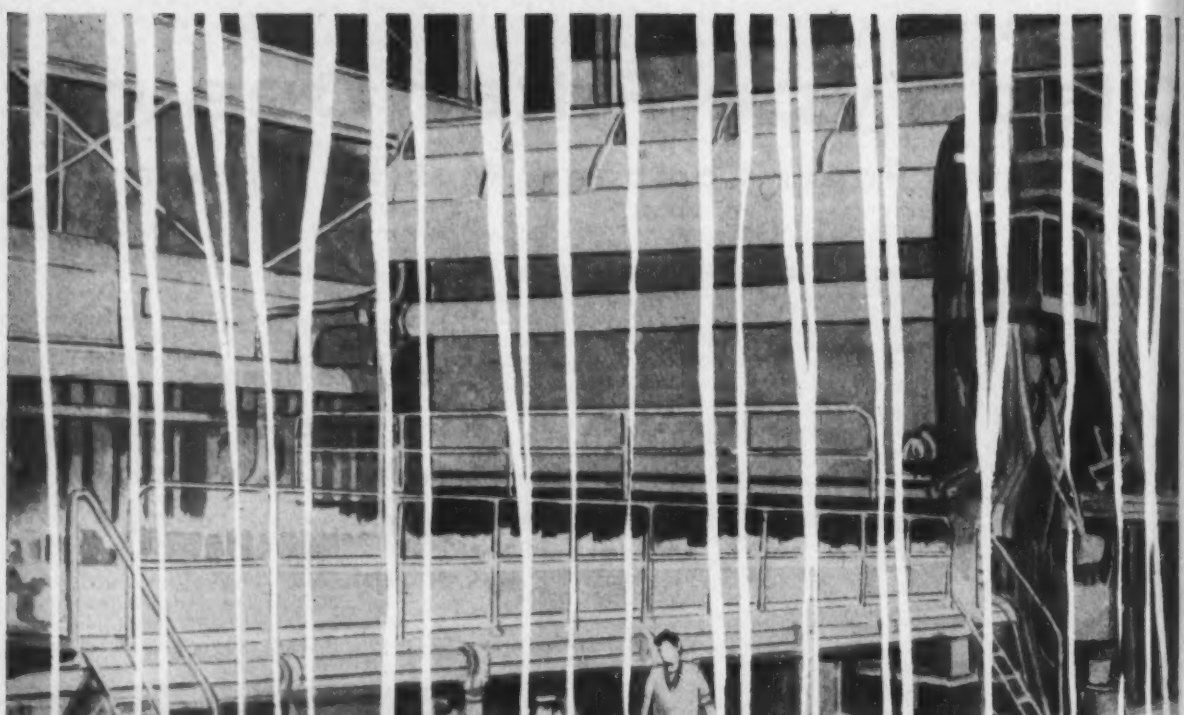

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Process for making paper pulp

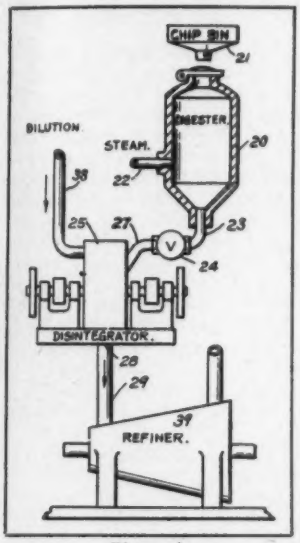

Figure 1

U.S. 2,957,795 issued Oct. 25, 1960 to Harold D. Stuck and assigned to John W. Bolton & Sons Inc., describes a process of making paper pulp from wood chips with a minimum injury to the fibres, by elimination of internal explosion and external impact.

The principal object of the invention is to substitute a rotative centrifugal and opposite whirling and impacting step for the usual internal explosion step between digestion and refining in the making of paper pulp.

As illustrated in Fig. 1 the first step of the process is the digestion of a charge of wood chips in a digester 20. Wood chips are fed to digester 20 from a chip bin 21 and in the alkaline process, a suitable charge of alkali is also included. Steam is introduced into the digester 20, through pipe 22 to raise the temperature of the digester charge to 340° F. at a pressure of about 110 psi in a time period of about one hour and forty-five minutes. The cook is then held at this maximum temperature and pressure for a period of about fifty-five minutes at which time it is ready for discharge out of the digester 20.

A conduit 23 leads from the base of digester 20, through a blow valve 24 and normally the conduit 23 would lead directly into a blow tank which is open to atmospheric pressure. It has been customary to open the valve 24 wide to permit the elevated pressure within the digester 20 to force the charge into the blow tank with great force and sudden reduction of pressure to atmospheric.

In the process of this invention, however, the conduit 23 leads directly into a rotary cage type disintegrator 25. The digester charge, made up of cooked wood pieces or chips together with cooking liquor, is not fed to the disintegrator 25 with the explosive force of a full reduction in pressure to atmospheric and the flow is controlled through valve 24 and fed in a thin stream with the valve passage only partly open. The disintegrator 25 includes a pressure chamber, a central inlet 27 and a circumferential outlet 28 leading to an outlet conduit 29. The digester charge of relatively high consistency, elevated pressure of over 100 psi and elevated temperature of over 300° F. upon arrival in the chamber is at a temperature of about 250° F. and a pressure of about 50 psi.

The rotary cage type disintegrator 25 is usually termed a cage mill and includes opposed, spaced apart rotors revolving at high speed around a horizontal axis and each having axially extending rollers extending toward the other and mutually overlapping. The digester charge is fed to the centre of the rotors through central inlet 27 and is then rapidly whirled and/or swirled around within the chamber in substantially concentric paths with each wood piece tending to be relatively gently disintegrated into smaller pulpy pieces by the overlapping rollers.

Paper containing titanous hydroxide

U.S. 2,967,797, issued Jan. 10, 1961 to Joseph R. Wechsler, Paul Lagally, and Herta Legally, assigned to Johnson & Johnson, describes a method of forming a paper sheet having improved wet strength.

A water soluble trivalent titanium salt is mixed with a slurry of paper pulp. The salt is then hydrolyzed to form titanous hydroxide, and a paper web is formed from the pulp and dried to form a paper sheet.

Continuous in line pulp molding machine

U.S. 2,967,568, issued Jan. 10, 1961 to Paul D. Friday and assigned to Paper Maid Inc., describes an improved pulp molding machine.

As shown in Fig. 2, the invention consists of a machine employing a carrier mechanism A for a continuous series of

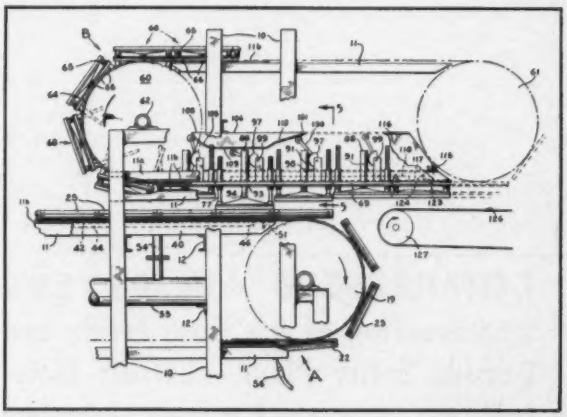

Figure 2

female or forming die holders and a second carrier mechanism B for a continuous series of male or transfer die holders. The carrier for the forming die holders consists of pairs of end sprockets and a pair of spaced, endless chains movable around the sprockets. These chains carry a continuous series of the forming die holders which move under means for supplying furnish, and associated with these holders is an elongated vacuum bar having suction means which serves to subject the forming dies to suction during travel on the tracks.

The structure of the second carrier B is similar to that of the first carrier, and this carrier is disposed above the first carrier, parallel with it, and in partial overlapping relationship. In this overlapped portion the transfer die holders are arranged to move downwardly to place transfer dies into firm contact with forming dies for forming the pulp article. This contact is maintained for a time sufficient to calender the rough surface of the article. A vacuum bar is also associated with the transfer die holders and serves to provide suction to transfer the formed articles from the forming dies to the transfer dies.

Instrument control of freeness on the fourdrinier wire

U.S. 2,965,168, issued Dec. 20, 1960 to Edward D. Beachler and assigned to Beloit Iron Works, describes a method of improved control in the stock refining process in the production of paper.

The invention is based on the discovery that greatly im-

proved control in the operation of a paper machine is obtained if a sensing device for the freeness of the web on the wire is employed to actuate the means in control of axial movement of the plug in the refiner.

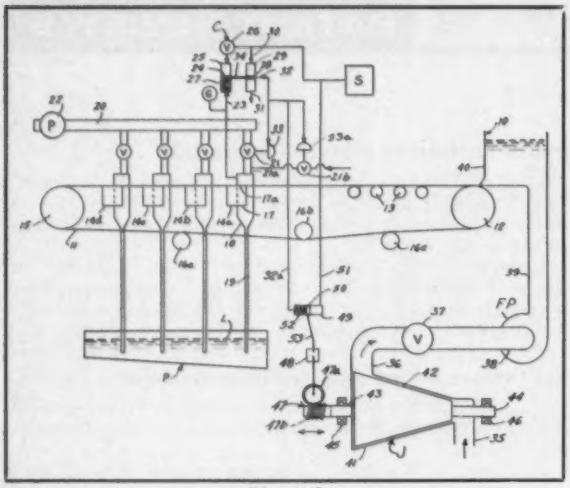

Figure 3

As shown in Fig. 3 a looped forming wire 11 is trained over a breast roll 12, table rolls 13, suction boxes 14a, 14b, 14c, 14d, a couch roll 15, and return rolls 16a, 16b, 16c.

Referring to suction box 14a, this consists of a long narrow box 17 provided with a perforated top cover 17a engaging the bottom of the wire 11. The box 17 and cover 17a extend the full width of the wire 11 and an air-water separator 18 is connected to the interior of the box 17 and is equipped with a drop leg 19 which extends downwardly below the level L of water in a seal pit P maintained below the level of the wire 11. The action of water in the drop leg 19 creates some vacuum in the separator 18. The separator 18 is connected to a vacuum header 20 through a control valve 21 (mounted in a conduit 21a interconnecting the separator 18 and the header 20) for increasing the separator vacuum. In addition, valve 21b may admit atmospheric air into the conduit 21a to reduce vacuum in it. A pump 22 maintains constant vacuum in the header 20 and the control valve 21, 21b control the vacuum in the separator 18 and, therefore, the vacuum in the suction box 17. A vacuum sensing line 23 (equipped with a gauge G) is connected to the separator 18 and continuously senses the vacuum in it. A control device C operates in response to signals from the sensing line 23 to control the valve 21, 21b and thus control the vacuum in the suction box assembly 14a.

The control C consists of a piston 24 mounted in the cylinder 25. Air from compressed air source S is fed through a pressure regulating valve 26 into the top of the cylinder 25 to urge the piston 24 downwardly. A spring 27 tends to counteract the downward force applied to the piston 24 by the compressed air and the vacuum sensing line 23 communicates with the cylinder 25 at the bottom, on the spring side of the piston 24. Variations in the vacuum thus cause relative movement between the piston 24 and the cylinder 25, as sensed through the line 23. If the vacuum in the line 23 increases the piston 24 is moved downwardly, and vice versa.

A second piston 28 is mounted for movement in a second cylinder 29, as another part of the control device C. Compressed air enters the top of the cylinder 29 through the line 30 and an air bleed 31 to the atmosphere is mounted at the bottom of the cylinder 29. At the middle of the cylinder 29 there is positioned an air supply line 32 which supplies actuating air to the control mechanism 33, 33a for the valve means 21, 21b.

An increase in the freeness of the stock results in an increase in the pressure in the vacuum sensing line and this, in turn, results in upward movement of the piston 28 to cause a reduction in air pressure in the air supply line 32. The valve 21, which closes in response to increased air pressure applied to the mechanism 33 will thus move toward open position to permit more air to be drawn into the vacuum header 20 and effect a corresponding decrease in the separator air pressure. The air pressure in the compressed air line 32a, which is connected to the air supply line 32, will also decrease and such decrease serves to move the piston 50 to the left in the cylinder 49. The piston 50 is connected through a switch 53 to the motor 48 and movement of the piston 50 actuates the motor 48. The movement of the piston 50 to the left actuates the motor 48 to drive the worm gear 47 so as to move the plug 42 to the right slightly. This will cause increased refinement of the stock and a consequent decrease in the freeness on the wire 11.

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Other Patents of Interest

Subject	Inventor or Assignee	Patent No.	Date
Pulp molding apparatus	Diamond National Corp.	2,961,042-3	11/22/60
Dirt filtering bag	Studley Paper Co. Inc.	2,961,063	"
Molded pulp bottle carrier	Diamond National Corp.	2,961,123	"
Corrugated cardboard package for garden and fruit products	Nobill a. r. l.	2,961,139	"
Food container	Bloomer Bros. Co.	2,961,140	"
Tray structure for bottles	Mead Packaging Inc.	2,961,143	"
Pilfer-proof box	American Box Board Co.	2,961,144	"
Paper carton with handle	Erick W. Ellison	2,961,145	"
Corrugated paper shredding machine	Lyle Wagnon	2,961,173	"
Mechanism for feeding a web of cardboard paper	Firma Fr. Hesser, Maschinenfabrik A. G.	2,961,181	"
Sized paper	Hercules Powder Co.	2,961,366-7	"
Production of molded pulp egg cartons	Diamond National Corp.	2,961,368	"
Paper coating process	Monsanto Chemical Co.	2,961,419	"
Trussed-end paperboard carton	Continental Can Co. Inc.	2,962,202	11/29/60
Collapsible shipping container	Crown Zellerbach Corp.	2,962,203	"
Multi-layer cross bottom valve bags	Carl Honsel	2,962,412	"
Manufacture of wood pulp	The Meade Corp.	2,962,412	"
Production of pulp	Ernest R. Hatheway	2,962,413	"
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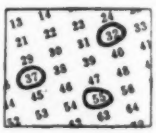

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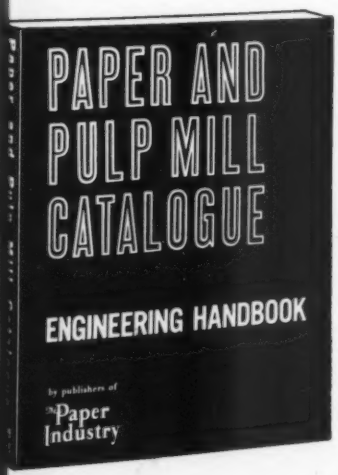

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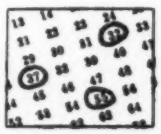

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CONTENTS:

- **Manufacturers Catalogue Section** — contains pages and complete inserts giving information and data on products of individual manufacturers. Pages appear in alphabetical order by names of manufacturers.
- **Buyers Service Section** — includes a comprehensive, cross-reference list of machinery, equipment, materials and chemicals with names of responsible manufacturers and suppliers; a list of trade names; complete addresses of all firms that are listed in the Section; and a directory of educational institutions in the United States and Canada having courses of instruction in the manufacture of pulp and paper.
- **Engineering Handbook Section** — a compilation of practical engineering data, formulas, graphs, charts, tables, etc., including a section dealing with uses and hazards of chemicals used in pulp and paper making. New material added yearly.

Paper and Pulp Mill Catalogue
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431 South Dearborn Street
Chicago 5, Illinois

Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Safety kit

An illustrated plant safety kit is designed to make fork lift truck operators more efficient and safety conscious in their materials handling work. The kit contains a pocket-sized lift-truck operator's guide, four humorous safety cartoons and route posters. — Towmotor Corp.

Circle No. 1 on Readers' Service Card

Storage tank

A liquid processing or storage tank, featuring a chemically resistive, seamless plastic inner shell and a metal outer shell, is now available. The tank can be used for storing acids, corrosive liquids, and hot water. It features a symmetrical top and bottom, melamine plastic tank end enclosures and a rigid, moulded two-piece styrofoam insulation jacket. — Bruner Corp.

Circle No. 2 on Readers' Service Card

Booster pump

The new turbine regenerative centrifugal booster pump is designed for booster service up to 60 psig in suction, boiler feed, condensate return, transfer or circulation. This model comes in 85 sizes with the following maximum limits: discharge 160 psig, suction 60 psig, mechanical seal 110 psig and temperature 210°F. — Roy E. Roth Co.

Circle No. 3 on Readers' Service Card

Converting unit

A converting machine especially designed for the conversion of photocopy and other sensitized and coated papers, is now available. The unit converts paper to "A" size sheets eliminating sheeting and straight knife cutting with the usual attendant operations. The new machine slits to width, cuts to length, stacks and counts the paper presenting the converted product to an operator for packaging. — Hobbs Mfg. Co.

Circle No. 4 on Readers' Service Card

Axial flow fan

Variax, Danish designed and engineered variable axial flow fans, will be available in the United States for the first time, in standard and custom-built units, for use as induced, forced draft or cooling fans. Designed in accordance with the latest aero-dynamic principles, custom built and standard fans are controlled during operation by variation of the blade angle. Both horizontal and vertical models are available for installation in restricted and difficult areas. — Novenco Inc.

Circle No. 5 on Readers' Service Card

Draw speed indicator

A new electronic draw speed indicator has been proven effective in the detection of: slippage between rolls and felt, wire and felt and between two felts where they run together; unduly high buildup of draw speeds around a felt; surging or discontinuous loads caused by variation of helper drive inputs; misalignment of rolls or variations of stretch curve patterns from front to back of machine. This instrument is a four-decade counter equipped with two inputs and a timing device. Two transducers with measuring wheels mounted on their shafts can be plugged into the inputs allowing for measuring two different draw speeds simultaneously. — Huyck Felt Co.

Circle No. 7 on Readers' Service Card

End hose fitting

A new, exclusive end hose fitting, permits joining of the tube directly to one end of a hose assembly without the use of an adapter. The fitting eliminates the need for a female swivel or any threading, flaring or soldering of tubes or pipes. They are available for either double wire braid hose or single wire braid hose. The fittings are reusable and can be reassembled as often as desired. — Lenz Co.

Circle No. 6 on Readers' Service Card

Wax sizing agent

A new wax sizing agent for paper and board is said to decrease strength loss by 50 per cent or more. A 45 per cent wax emulsion, Nopco Size 1055-V improves the general overall sizing of paper or board by improving finish smoothness and gloss, printability, and resistance to lactic acid, and hot chemicals. It was developed for use with regular rosin and fortified rosin sizes. — Nopco Chemical Co.

Circle No. 8 on Readers' Service Card

Hose adaption kits

Two new hydraulic hose adaption kits are now available as off-the-shelf items for Clark trucks. The kits are packaged as either two-hose or four-hose units and simplify the field installation of fork truck attachments. They include 45 or 90 ft. of hose, hose end fittings, brackets, sheaves and guide rods necessary to make a complete connection between the auxiliary valve and terminal point on the truck's fork carriage. Each kit contains enough

material to make an installation on any upright not exceeding 180 in. maximum fork height. — Clark Equipment Co.

Circle No. 9 on Readers' Service Card

Ear protectors

This new model ear protector kit includes the fittings necessary to attach the domes to a cap. It has been tested and approved for use in harmful noise areas of construction, pulpwood and metalworking industries. A communications model is also available. — David Clark Co. Inc.

Circle No. 10 on Readers' Service Card

Gram-ounce scale

This versatile gram-ounce scale is ideally suited for production line weighings and checks, spot checks, chemical weighings, quantity counts by weight, and all necessary but only occasional needs. The scale is calibrated in ounces from 0 to 16, and grams from 0 to 450. — Edmund Scientific Co.

Circle No. 11 on Readers' Service Card

Alarm scanner

A new 200 point transistorized alarm scanner capable of scanning up to 200 measured variables at the rate of one point per second, is now available. On discovery of any off-normal situation, the instrument activates a recorder, actuates a red alarm lamp, and energizes any desired external alarm system. Upon completion of these functions, the instrument returns to normal scanning leaving the alarm lamp on until a reset button is depressed. — Bristol Co.

Circle No. 12 on Readers' Service Card

NO WRINKLES
NO Hard or Soft Spots at the Winder with . . .
RMF hydroscillators
This simple, compact oscillating unit provides a constant horizontal shifting motion while the sheet is being wound into a roll. This back and forth movement prevents wrinkles from "tracking" and building up throughout the roll. No more wrinkles, no more hard and soft spots!
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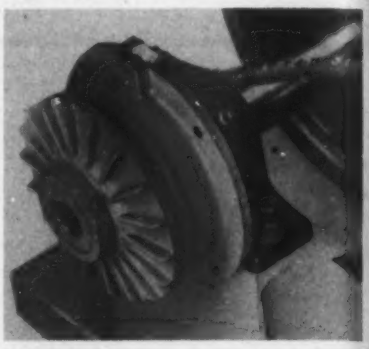

Air brake

Operating on static air pressure, this new air brake comes in three models for applications up to 4,300 in lbs. torque. Uniform, sure stops without brake fade, are assured. The brake uses flange or torque arm type universal mounting, and is especially designed for stopping rotating parts. — Horton Mfg. Co.

Circle No. 13 on Readers' Service Card

Electrical thermometer

Instant direct reading of temperature in combination Fahrenheit-Centigrade scale readings, is now a feature of the Model T-I precision electrical thermometer. It will instantly determine temperature of surfaces, liquids or gases upon application of a thermistor sensing probe to the surface of the substance to be tested. — Ameresco Inc.

Circle No. 14 on Readers' Service Card

Centrifugal dust collectors

A wider range of more efficient operation is attained with a new series of centrifugal dust collectors which pro-

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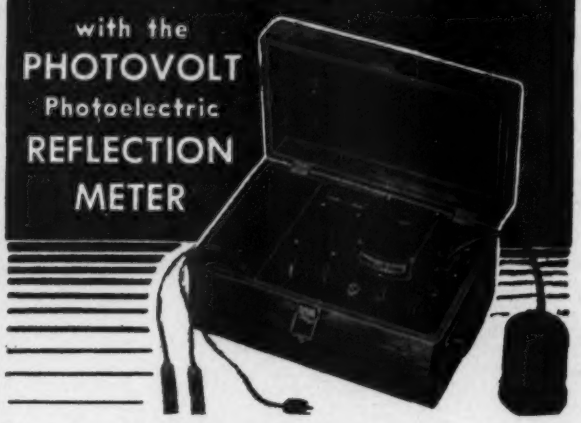

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of pulp and paper in terms of TAPPI specifications.
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For more data circle 132 on Post Card

vide up to 2,500 cfm of air with a 5 hp. motor. They are designed primarily to handle materials like dust, chips, shavings and blocks from wood. The blower features a self cleaning, radial design wheel, developed to handle light materials without clogging. — Torit Mfg. Co.

Circle No. 15 on Readers' Service Card

Spiral nozzles

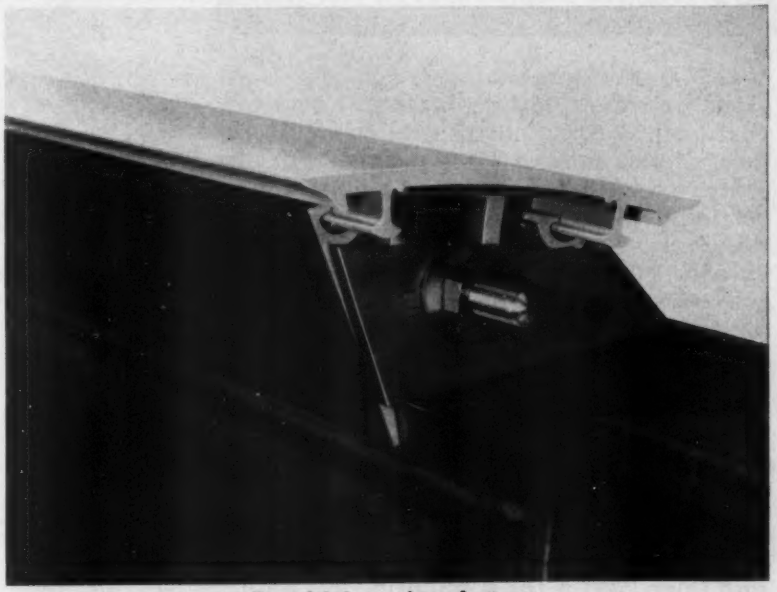
Eight new models of non-clogging spiral nozzles are now available. The new nozzles are made from one piece of material and give better atomization at lower pressures than conventional nozzles of similar capacity, it is claimed. They provide capacities of 4 and 8 gpm at 40 psi with wide or narrow angle and full or hollow cone pattern. — Bete Fog Nozzle Inc.

Circle No. 16 on Readers' Service Card

Liquid metering stations

Centrally-located panels for reading positive displacement liquid meters have just been announced. Called Read-O-Matic, it allows plant personnel to take precise readings on liquid meters as much as one half mile away from the meter. It is powered by a self-contained generator in the meter to which it is attached. A magnet and coils in the generator transmit an electrical pulse over wiring to the totalizing counter on the remote reading device. Register dials are calibrated in gallons or cubic feet. — Badger Meter Mfg. Co.

Circle No. 17 on Readers' Service Card



Fourdrinier wire doctor

Specifically engineered as replacements for table rolls, wire doctors are designed to eliminate the pressure ridge that is generally associated with table rolls, and to maintain a control over drainage from the wire to a degree not possible with table rolls. Snap back of the fourdrinier wire is minimized.

The wire doctor consists of a stationary, semi-rigid extruded cover, head assembly to provide for adjustment of the cover, a support beam and brackets for mounting. In operation the cover's beveled leading edge both supports the wire and skives water from its underside. Camber of the cover can be freely adjusted while the machine is running to regulate the amount of drainage in-

Continued on page 273

GREATEST BREAKTHROUGH IN PAPER MFG. INDUSTRY!

TISCO®
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DEMOUNTABLE PLUGS FOR *FAST* REPLACEMENT

TISCO demountable cast alloy steel plugs permit ready replacement of worn parts, eliminating costly rebuilding or return of the plug to the supplier for replacement. TISCO castings can be supplied in tough 13% austenitic manganese steel. Where both corrosion and wear are involved, TISCO TIMAXX® or TICHROMAXX are recommended. Special heat treatments for the latter can be specified which will provide improved properties. Other alloy steels are available which can be heat treated to higher hardnesses for improved wear, but only where impact is at a minimum.

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For more data circle 133 on Post Card

Continued from page 271

duced by vacuum through the wire. Comparable flexibility with table rolls can be achieved only through substitution of rolls of differing diameters. — Lodding Engineering Corp.

Circle No. 18 on Readers' Service Card

Drain valve

An improved self-draining valve with a reciprocating stem eliminates galling. It is ideal for installation where it is desirable to have the valve seat inside the wall of the pipe or vessel. It is standard with a 1 in. N.P.T. tank connection, ¾ in. female drain connection, and ½ in. plugged purge connection. Standard materials are carbon steel body, rustproofed and hardened stainless steel stem. — Jerguson Gage & Valve Co.

Circle No. 19 on Readers' Service Card

Hand-operated diaphragm pumps

The Edson hand-operated self-priming diaphragm pump will handle virtually any material that will flow. It readily pumps liquids containing solids of any size or shape that can pass through the two-in. suction and discharge connections. The pump is completely self-priming, has a suction lift of 25 ft., and its capacity is 1800 gal. per hr. — Edson Corp.

Circle No. 20 on Readers' Service Card

Repair compound

Devon BR, a new repair compound consisting of 80 per cent bronze, and 20 per cent plastic, is now available for filling large blow holes and other imperfections in bronze and brass cast-

Continued on page 274

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make this slick...

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Provide your customers with paper products that give quick, complete release from the stickiest materials — save time and money.

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INSTALL *OVERLY* VEE-GRIPS IN YOUR STOCK LINES

- A tight seal in seconds.
- Pipe is held in perfect alignment.
- Weigh less and cost no more than ordinary back-up flanges.
- Available for 3", 4", 6", 8" and 10" tube and pipe.

Save time! Replace ordinary back-up flanges in your stock lines with Overly Vee-Grips! Easily put on or taken off in seconds. Pipe joints are held in perfect alignment, assuring a smooth flow of stock. They also improve the appearance of your stock line installations.

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OVERLY'S INCORPORATED

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Continued from page 273

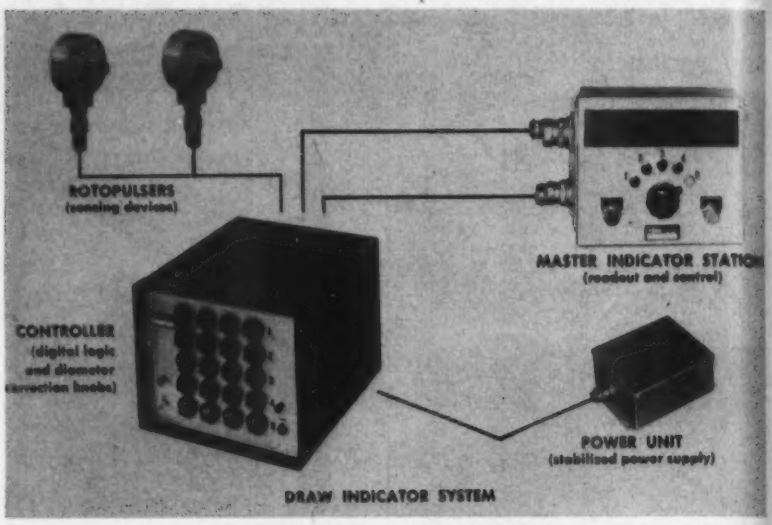
ings. It can be bonded to iron, steel, aluminum, brass, wood, glass, and other surfaces. Tensile strength of the new material is 9,000 psi; compression strength, 20,000 psi. It is unaffected by oil, water and most chemicals. Shrinkage during hardening is only 0.0005 per in. — Devcon Corp.

Circle No. 21 on Readers' Service Card

Temperature controller

A new temperature controller is known as the Pt Temperature Controller. It is a resistance bulb signaling type offering a choice of on-off or proportioning control over the range from −150° F. to +1050° F. Interchangeable scales are printed on stainless steel in one degree graduations and 300° spans, for both F. and C. One probe handles all ranges. Other features include transistorized circuitry, platinum resistance thermometer sensing element, plug-in construction, and low power requirements. — Technique Associates.

Circle No. 22 on Readers' Service Card



Digital draw indicators

A complete line of digital draw indicators for precise draw or speed measurement on paper machines, is now available. The indicators count the number of rotations of each of two rolls and electronically compute the ratio of these two quantities by digital method. They measure both draw or speed to 0.1 per cent accuracy at all operating speeds and require no calibration since the systems are stable and not subject to drift and loss of accuracy.

The indicators are available in type A and B designs. Type A units have a maximum capacity of 5 channels for measuring 5 draws or speeds. Type B units are large capacity console designs capable of handling as many as 50 draws or speeds. — Louis Allis Co.

Circle No. 23 on Readers' Service Card

Continued on page 276

ANOTHER F.M.P. BARKING DRUM INSTALLATION

2-12' x 67-½' F.M.P. BARKING DRUMS with air-operated discharge gates at Continental Can Co., Augusta, Georgia

SOME CHARACTERISTICS OF F.M.P. DRUM:

High Speed (8 r.p.m. for 12' D. Drum) with increased capacity possible with chain suspension and spring-loaded bearings.

Long life of drum shells due to chain suspension, spring-loaded bearings, short spans between supports (4 chain supports for 12' x 22-½' shells), and shop-welded stress relieved shells.

Replacement of essential parts can be done quickly without lifting drum shells. (Traction-, guide-, and sprocket rings are split.)

Drum can be operated dry with bark conveyor underneath, immersed in a circular vat (hot water for cold climate) for higher capacity and cleaner wood with bark conveyor on the side or last section only immersed for washing.

FIBRE MAKING PROCESSES, INC.

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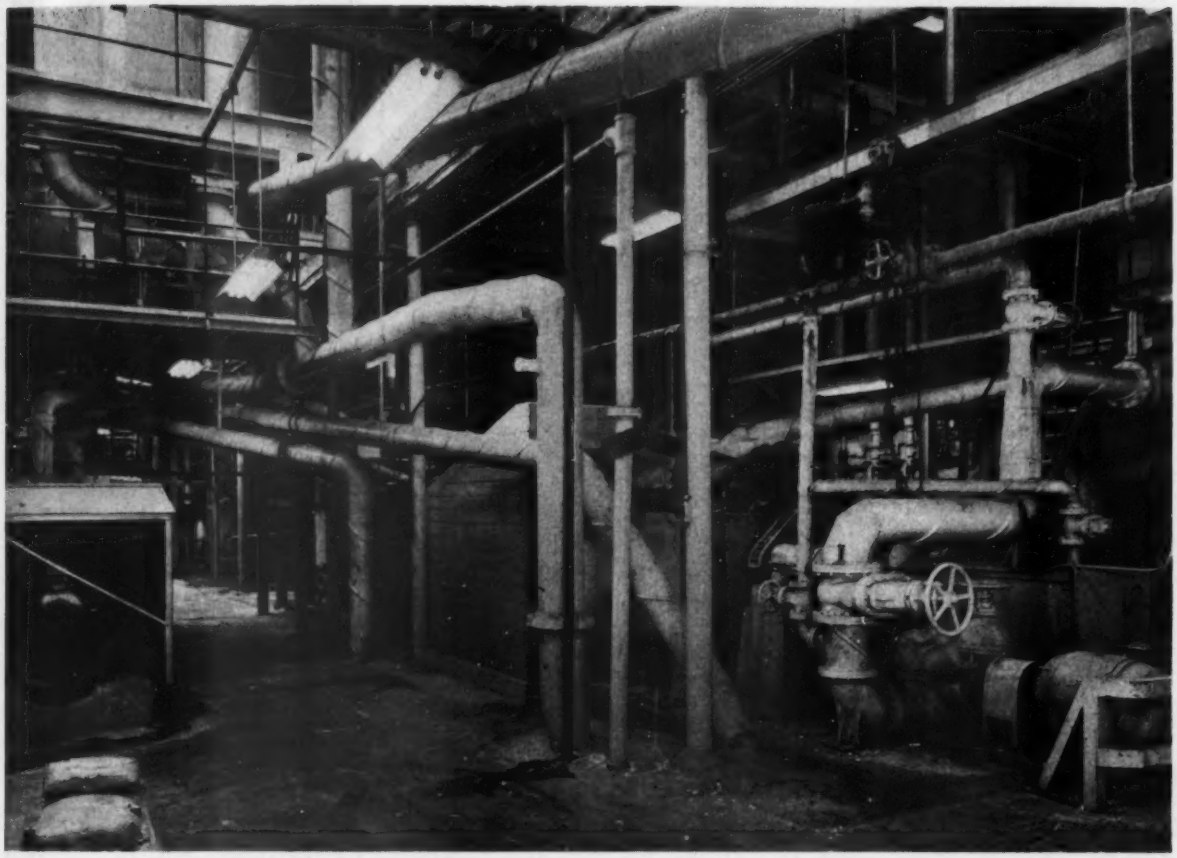
Simple or Complicated Piping...



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When you need pipe, fittings or special fabrications . . . in carbon steel, stainless steel or alloys . . . it will pay you to call on NAYLOR fabrication service.

You can depend on close-tolerance production to your exact specifications, assuring a perfect fit whether your layout is simple or complex.

Pipe sizes range from 4″ to 30″ in diameter and wall thicknesses from 14 to 8 gauge. Special piping fabrications from 3″ to 44″ in diameter and wall thickness up to ⅜″. Standard fittings are available from stock.

Write for Bulletin No. 59 or send specifications for quotation.

NAYLOR PIPE *Company*

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Any six digit number made up of two groups of the same three digits is divisible by seven, i.e.: 7 | 123 123 Try it!

All brush applications fall into one of three categories: applying ,arranging, removing, i.e.: (for paper) dampener, polishing, dusting.

Try your brush needs in these three basic categories — you'll find they fit. Try Jenkins' METLKOR in all of your brush applications. You'll find they not only fit, but contain a magic divisor too. Paper men have been relying on Jenkins' for dividing brush problems for nearly 100 years. Pose your brush problem . . . narrowest web to 300— inches, slowest speed to 3000— fpm . . . Jenkins' has the answer. Consult today! You'll settle for METLKOR.

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NEW PRODUCTS

Continued from page 274

Slitter rewind machine

The "Slit-Sel" slitter rewind machine is designed to slit a portion from one end or both ends of the parent roll without rewinding the remainder of the parent roll. The patent applied feature permits low roll inventories in that the user can slit only the number of rolls required from the parent roll for a specific application. The width of cut roll can vary from ¼ to any maximum width permitted by the width of the parent roll. — Smith & Winchester Mfg. Co.

Circle No. 24 on Readers' Service Card

Sleeve-bearings

Self-aligning, self-lubricating sleeve bearings, are available in flanged and pillow block types. They are designed to operate in temperatures up to 1,000° F.; in corrosive and contaminating conditions; in inaccessible locations where lubricating and maintenance are problems; where noise control is important; and at slow speeds. — Link-Belt Co.

Circle No. 25 on Readers' Service Card

Water sampler

A new, continuous water sampler is said to provide accurate, reliable proof of absence or presence of chemical and radioactive wastes. Called "Aquator", it is made of heavy gauge plastic which is corrosion-proof. A plastic flask is threaded into the base for collecting accumulated sedimentation. Its chief use has been to determine whether an industry is polluting a body of water. — Princeton Division of Curtiss-Wright Corp.

Circle No. 26 on Readers' Service Card

Water-soluble copolymers

Gantrez-AN resin, a water-soluble copolymer of methyl vinyl ether and meleic anhydride, is available as a free-flowing, white powder. It may be used by itself or in combination with other materials, as a sizing, binder, wet strength improver, dye-receptor, or protective colloid and thickening agent in textile and paper manufacture. It is also a dimensional stabilizer for computer tapes, machine sorting card, and interlinings. — General Aniline & Film Corp.

Circle No. 27 on Readers' Service Card

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These monthly newsletters are pipelines for information exchange among safety men in your industry. Here's what each newsletter has to offer:

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- Open discussions of controversial safety problems.
- A view of what others are doing for safety in the paper and pulp industry.
- Ideas and suggestions for successful safety promotions and "stunts" that will help maintain interest in your program.
- News of new safety devices that can be used in your operations.
- News of the safety people, projects and achievements within your industry.

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Books

FOREST FIRE: CONTROL AND USE. Written by Kenneth P. Davis, Professor of Forest Management, School of Natural Resources, University of Michigan. Published by McGraw-Hill Book Co. Inc., 330 W. 42nd St., New York 36. 584 pp. Price: $12.

This book is reported to be the first textbook devoted exclusively to forest fires. It integrates a considerable amount of material previously scattered throughout various manuals and handbooks, generally unavailable. Illustrations and descriptions of principal hand tools used in fire fighting are given along with a comparative analysis of the principal types of fire plows, and a comparative analysis of fire danger rating systems used in the United States and Canada.

PHENOLIC RESINS. Written by David F. Gould, consultant to Borden Chemical Co. Published by Reinhold Publishing Corp., Dept. B-298, 430 Park Ave., New York 22. 213 pp. Price: $5.75.

This book gives concise presentation of the raw materials, production methods and applications of the phenolic resins. Emphasized are the practical features, including commercial and economical considerations.

Each major field of application is described in separate chapters, and is up-to-date in every respect. The book also contains information on the use of phenolics in combination with other resins.

CENTRIFUGAL PUMPS, SELECTION, OPERATION, AND MAINTENANCE. By Igor Karassik and Roy Carter. Published by F. W. Dodge Corp., 119 W. 40th St., New York 18. 496 pp. Price: $15.75.

This book gathers together and synthesizes information covering the entire field of centrifugal pumps, their appurtenances, and control. It describes and thoroughly illustrates all types of pumps, including vertical, self-priming, and regenerative pumps. A useful data section completes the book.

FLOW METER ENGINEERING HANDBOOK. Compiled and edited by C. F. Cusick, Engineering Dept., Minneapolis-Honeywell Regulator Co. Published by Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Philadelphia, Pa. 170 pp. Price: $7.50.

This is the third edition of this handbook, which has been expanded to include information on primary devices other than orifice plates. The arrangement consists of including in three chapters all the data necessary to calculate or check an orifice plate for a specific fluid application. There are separate chapters for steam, liquid and gas. The nomenclature used has been approved by the major instrument manufacturers.

Booklets

THERMOPHILIC DIGESTION of a Mixture of Domestic Sewage Sludge and Cellulose Materials, is the title of a booklet published by Acta Polytechnica Scandinavica, Stockholm, Sweden. The 40 page booklet follows the course of digestion by means of analysis of the material left undigested.

AIR POLUTION CONTROL is the subject of a booklet describing a unique method of chemically eliminating objectionable odors resulting from industrial processing. The booklet has been published by Rhodia Inc., New York, N.Y.

DECOLORIZATION OF WASTE FROM CAUSTIC WASH OF CHLORINE-BLEACHED KRAFT PULP. This booklet is Series No. 141 of the Engineering Experiment Station and is published as the Bulletin of the Virginia Polytechnic Institute. Graphs and charts are given to illustrate the outlined problem.

Manufacturers' Publications

Copies of these publications are available at no obligation through our Readers' Service Department. Use the reply card which accompanies this issue when requesting items.

Silicone coatings

Dow Corning Corp. is offering a brochure describing how "Syl-off"® silicone coatings are used to stop sticking. Included in this new brochure are samples of coated paper plus a complete listing of approved sources for coated kraft, parchment, glassine, etc.

Circle No. 28 on Readers' Service Card

Air-dryers

Van Products Co. is offering a 16-page brochure on their moisture control compressed air-dryers. Graphs, charts, photos and illustrations supplement the copy describing the dimensional data, capacities, weights, accessories and standard specifications. Construction, installation, operation and maintenance are also discussed.

Circle No. 29 on Readers' Service Card

Flexible motor couplings

Link-Belt Co. is offering a new six-page folder on MC geared flexible motor couplings. The new publication brings together all the pertinent data on motor couplings including the new features added to the line. Charts and diagrams offer supplementary data for selection.

Circle No. 30 on Readers' Service Card

Pulpwood harvesting

Timberline Equipment Co. is offering a brochure describing the pulpwood material handling principle motivating equipment design and development in the Busch System. The brochure is illustrated to describe the entire process.

Circle No. 31 on Readers' Service Card

Dial indicators

Fairbanks-Morse & Co. is offering a new brochure describing the flexibility in design and utilization of their cabinet dial and pillar dial indicators. Cutaway photos show the full-floating, patented mechanism. Additional information is given in the form of charts and diagrams describing each model.

Circle No. 32 on Readers' Service Card

Vacuum system

Allis-Chalmers Mfg. Co. is offering a publication on their Vacu-Therm system for paper machine use. Described in the literature are a centrifugal exhauster, vacuum controls, and water seperation equipment. Included is a diagram to show how the system can be applied to existing mills as well as new or expanding plants.

Circle No. 33 on Readers' Service Card

Teflon

E. I. du Pont de Nemours & Co. is offering a "Journal of Teflon". Described here are the uses and properties of Teflon with a special section devoted to the use of Teflon in the paper industry. It offers supporting data in the form of pictures and charts.

Circle No. 34 on Readers' Service Card

Slitter-winders

Dilts Division of Black-Clawson Co. Inc. has published a bulletin on "How Duplex Slitter-Winders Meets Production Needs". Charts and photos supplement the details of equipment construction and good operating practice described in the copy.

Circle No. 35 on Readers' Service Card

Brushing tools

M. W. Jenkins' Sons Inc. is offering "Brushing Tools Engineered for Industry" a 20-page book explaining the advantages of quality brushing tools, and showing a number of typical successful applications in a wide variety of manufacturing processes. The book suggests methods of doing operations more economically, quicker and more efficiently with brushes. A question and answer section clarifies a number of questions about brushes for industry, their construction and application.

Circle No. 36 on Readers' Service Card

Spanish brochure on polyethylene

Eastman Chemical Ltd., a subsidiary of Eastman Kodak Co. is offering a brochure on Epolene C-10, a low-molecular-weight pa-

per coating polyethylene, in Spanish. The brochure discusses how properties of this product make it suitable for use in the production of polyethylene-coated papers by roll-coating techniques. Roll-coating methods used for coating such packaging stock as kraft, chipboard, glassine and parchment are described in detail and supplemented by diagrammatic sketches of equipment layout and roll arrangement.

Circle No. 37 on Readers' Service Card

Valve bulletin

Clarkson Co. is offering two bulletins regarding valves. Bulletin 2.4-1 describes and diagrams pressure loop systems with slurry valves to increase paper pulp refiner production. Bulletin 10.0-1 describes and diagrams automatic control adaptation of Clarkson C. valve.

Circle No. 38 on Readers' Service Card

Beater bars and bed plates

Simonds Worden White Co. is offering a bulletin describing and illustrating the full line of the company's beater bars, bed plates and bed plate steels for all types and makes of beaters in the paper industry. Illustrations and data on standard beater bar and bed plate patterns are given.

Circle No. 39 on Readers' Service Card

Draw indicators

Dynapar Corp. has published a four-page bulletin describing Types A and B Digital Draw Indicators. The operating principle of the indicators is described fully with emphasis on measuring draw and speed. Photos and charts supply further information on these products.

Circle No. 40 on Readers' Service Card

Rotary feeders

Beaumont Birch Co. is offering a two-color bulletin on rotary feeders for feeding bulk materials, chemicals and slurries under high differential pressures. Illustrations and diagrams show how every part of the feeder is subject to wear. Other features include engineering data and safety features.

Circle No. 41 on Readers' Service Card

"Takeups"

Link-Belt Co. is offering a new 16-page book on takeups in seven frame styles and equipped with sleeve, ball or roller bearings. The book contains descriptions of the complete line of takeups and information for selection and application with dimensional data for each frame.

Circle No. 42 on Readers' Service Card

Dryer drainage systems

Stickle Steam Specialties Co. is offering a bulletin on their latest dryer drainage systems for paper and board machines. Both two and three section systems are illustrated, along with micro adjustable orifices, pneumatic diaphragm motor control valves, condensate receivers, and flash tanks, wet end temperature controllers, vacuum pumps and control panels.

Circle No. 43 on Readers' Service Card

Pneumatic winders

Jagenberg USA Inc. is offering a brochure describing the company's pneumatic winders. The 8-page bulletin gives technical data on three different models along with charts, diagrams and pictures of the rolls in operation.

Circle No. 44 on Readers' Service Card

Instruments and controls

Bailey Meter Co. has published a four-page bulletin describing the complete line of the company's instruments and controls. The bulletin illustrates and describes fluid meters for recording, indicating and integrating; transmitters and recorders; level transmitters; and temperature instruments. Also illustrated and described are plug-in components, analysis instruments and the 700 Analog and Digital systems.

Circle No. 45 on Readers' Service Card

Wetting agents

Nopco Chemical Co. is offering a new booklet describing a comprehensive line of wetting agents for diversified industrial uses. The brochure suggests applications for the agents in several fields, including paper. The publication also contains accurate Draves wetting times of the various agents listed, with additional data on chemical and physical properties and general recommendations for use.

Circle No. 46 on Readers' Service Card

Sheet finishing systems

Lamb-Grays Harbor Co. is offering a new 12-page folder describing its sheet finishing systems, including trimmer feed systems and discharge systems for skid-loading, trim-size, and cut-size. The folder illustrates various system combinations and options as well as photographs of individual components and equipment.

Circle No. 47 on Readers' Service Card

Packaging guidebook

Olin Mathieson Chemical Corp. is offering an illustrated booklet designed to help manufacturers select the proper shipping container for each product. The first section of the 34-page brochure describes in individual detail the broad range of basic corrugated container designs. A second section discusses special container designs for products that are unique in shape or construction.

Circle No. 48 on Readers' Service Card

Dandy roll suction box

Sinclair Co. has published a leaflet on their new dandy roll suction box. The new suction box principle is illustrated and a comparison of watermarks is given.

Circle No. 49 on Readers' Service Card

Special coatings

S. C. Johnson & Son Inc. has issued a four-page folder describing 18 special industrial coatings, many of which have applications for paper makers. It includes data on application methods, coverage, drying time and characteristic uses.

Circle No. 50 on Readers' Service Card

Service brochure

Portland Copper & Tank Works Inc., Pulp and Paper Division, has prepared a product and service brochure of interest to engineers, superintendents, master mechanics and production personnel in the pulp and paper fields. Illustrated in the brochures are several types of equipment and a list of engineering services.

Circle No. 51 on Readers' Service Card

Fourdrinier "Techni-Pak"

Mount Hope Machinery Co. is making available a series of 14 data sheets with detailed technical information on the use of their roll in varied operations in the paper industry. The sheets are available separately or in a "Techni-Pak", a pocket folder including all data sheets plus literature on equipment for fourdrinier machines, cylinder machines and converters.

Circle No. 52 on Readers' Service Card

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Excellent opportunity for chemical engineer or pulp and paper school graduate in development engineering phases of technical service and research. Some paper industry experience desirable.

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Personnel Department,
P. H. GLATFELTER CO.
Spring Grove, Pa. —
Phone — Spring Grove 223-3216

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Bacteriologist for dual purpose job, laboratory work and customer service. Must be willing to travel approximately 50 percent of time. Salary open to discussion. Give complete references as well as former employment. Write Box 714, The PAPER INDUSTRY.

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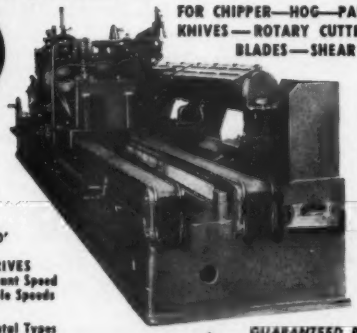

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For more data circle 140 on Post Card

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For more data circle 143 on Post Card

NAMES IN THE NEWS

Continued from page 260

mill of the company, has been named assistant mill manager. He replaces Adam Rozyskie, who has retired.

Lamb-Grays Harbor Co. Inc.

Robert F. Neilsen has been promoted to the position of sales manager of this company, Hoquiam, Wash. Prior to his association with Lamb, he was project engineer for Buckeye Cellulose Co. Neilsen will be responsible for the direction of all phases of the company's domestic and foreign sales engineering program.

Neilsen

Vannatta

Mead Corp.

Russell E. Vannatta, plant manager of the company's Cincinnati division for the past eight years, has been promoted to division manager. Vannatta has been with Mead since 1946.

St. Regis Paper Co.

Edward F. Herrlinger II has been named president of the Gummed Products Co. Division at Troy, Ohio. Herrlinger, who succeeds his father, the late Roth F. Herrlinger, is a grandson of the founder of Gummed Products.

Dr. R. W. Reed has been appointed assistant manager of manufacturing for the Printing Paper Division. In this position, Reed is directly responsible for the operation and administration of the printing paper mills.

Container Corp. of America

Richard C. Winkler was appointed general manager of the Baltimore plant Container Corp. Winkler, who succeeds G. H. Linde in his new post, joined the company in its Boston corrugated plant as a trainee, progressing to plant manager.

G. H. Linde will be special sales representative for the Baltimore area. He was general manager of the Baltimore plant.

Allied Chemical Corp.

John R. Edmonds has been appointed director of production for Allied Chemical's General Chemical Division, New York. With the division for 21 years, Edmonds has been product manager for a group of industrial and agricultural chemicals for the past three years.

Rudolph

Edmonds

Paper Converting Machine Co.

John M. Rudolph has been appointed to the sales engineering staff of this company of Green Bay, Wis. Rudolph is well known in paper industry circles for his contributions while associated with Black-Clawson Co. His duties will include sales and promotion within all Latin American countries.

Marathon Southern Corp.

Floyd W. Nienow has been promoted to the position of plant engineer at Marathon's converting operations at Naheola, Ala. Nienow formerly was supervisor of the pulp and paper section in Menasha, Wis.

Tom Orr has been assigned to the new position of production superintendent in Naheola. He was the former technical services superintendent.

Jerome C. Marquardt succeeds Orr as technical services superintendent. This entails supervision of production divisions, all laboratory activity and process engineering. Marquardt was paper mill superintendent at the Oswego, N.Y. plant.

John W. Olfson has been named converting department superintendent in charge of converting Naheola tissue and toweling into household and industrial products. Formerly he was converting department proj-

Continued on page 282

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt	
No. 1 white shirt cuttings	10.00—	10.50
Soft unbleached muslins	13.50—	14.00
Fancy shirt cuttings	2.00—	3.00
No. 1 percales	4.00—	5.00
No. 1 washables	2.00—	2.25
No. 1 light silesias	6.50—	7.00
Light flannelettes	5.50—	6.00
Cottonades	2.25—	2.50
Blue overall cuttings	5.00—	5.50
Blue cheviots	6.75—	7.25
Canton flannels, bleached	9.00—	10.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	8.50—	9.00
Underwear cuts, bleached	10.50—	11.00
Underwear cuts, unbleached	10.50—	11.00
Sun tan khaki cuttings	5.00—	5.50

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York.

	per cwt.	
No. 1 roofing (Chicago)	.65—	.70
No. 2 roofing (Chicago)	.55—	.60
Twos and blues, repacked	2.00—	2.25
Thirds and blues, repacked	1.50—	1.75

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	85.00—	90.00
No. 1 hard white shavings	70.00—	75.00
No. 1 soft white shavings	45.00—	50.00
Soft white shavings, uncoated	55.00—	60.00
Fly leaf shavings No. 1	17.00—	22.00
Fly leaf, woody, No. 1	17.00—	20.00
Mixed colored shavings	16.00—	18.00
No. 1 books and magazines	13.00—	15.00
Ledger stock, white, No. 1	40.00—	45.00
Ledger stock colored, No. 1 (Midwest ship)	27.50—	30.00
New manila envelope cuttings (free of groundwood)	50.00—	55.00
New manila envelope cuttings (containing groundwood)	40.00—	45.00
Manila tab cards	50.00—	55.00
Colored tab cards	40.00—	42.50
New northern kraft envelope cuttings	50.00—	55.00
Triple sorted kraft, 100%	30.00—	32.50
No. 1 old kraft	22.50—	
White news cuts, No. 1	40.00—	45.00
No. 1 overissue news	15.00—	17.00
Folded news, special	11.00—	12.00
Folded news, ordinary	9.00—	10.00
Old corrugated boxes	16.00—	17.00
New jute corrugated cuts	19.00—	20.00
Mill wrappers	9.00—	11.00
Boxboard cuttings	4.00—	5.00
No. 1 mixed paper	1.00—	4.00

CHEMICALS

F.o.b. New York City

Alum, ammonium		
Granular, bags, works, cwt.	4.30—	
Lump, drums, works, cwt.	5.05—	
Powdered, drums, works, cwt.	5.20—	
1-Arginine, drums, kilo	60.00—	
Blanc Fixe		
Direct process, bags, c.l., works, ton	160.00—	
L. c. l., ton	170.00—	
Casein, domestic acid precipitated		
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—	
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—	
Imported, 30M Argentine, ex-dock, c. l., lb	.18½—	
30M N.Z. Lactic, ex-dock, c. l., lb.	.25—	
China Clay, domestic dry-ground, airfloat, 99%		
325-mesh bags, c.l., Georgia works, ton	11.00—	17.00
300-mesh bags, c.l., Georgia works, ton	13.50—	22.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	23.00—	.35.00
Chlorine, liquid		
Tanks, single units, works, freight equaled, cwt.	3.25—	
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb	.26¾—	
Litharge, commercial powdered		
Barrels, c. l., works, freight equaled lb.	.13¼—	
Rosin, gum, c. l., f.o.b. New York, cwt.		
K, M.	12.75—	
N	12.85—	
WG	12.95—	
WW	13.00—	
Rosin, wood, c. l., f.o.b., shipping point, cwt.		
K, M	11.00—	12.25
N	11.25—	12.35
WG	11.50—	12.55
WW	11.75—	12.85
Saltcake, domestic, bulk works, 100% Na_2SO_4, basis ton	28.00—	
Soda Ash		
Dense, 58%, paper bags, c.l. works, cwt	1.90—	
Light, 58%, paper bags, c.l. works, cwt	1.85—	
Soda, caustic		
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—	
Solid, 76%, drums, c. l. works, cwt.	4.80—	
Sodium Silicate		
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.65—	
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—	
Starch		
Pearl, 140-lb. bags, cwt.	6.73—	
Pearl, 100-lb. bags, cwt.	6.58—	
Powdered, 100-lb. paper bags, cwt.	6.78—	
Sulfur, crude		
Bulk, c. l. mine, contract, long ton	23.50—	
Talc		
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—	
Canadian, ground, bags, c. l. works, ton	20.00—	35.00
Titanium Pigment		
Calcium-rutile base, regular, bags, c. l., lb.	.09⅓—	
High-tinting, drums, c. l., lb.	.14⅓—	
Zinc Oxide Pigment, American process		
Lead-free, bags, c. l. freight allowed, lb.	.12½—	
Leaded, 35%, bags, c. l., freight allowed, lb.	.14 —	

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	140.00—	
Bleached sulfite, Canadian	140.00—	
Unbleached sulfite, Canadian	125.00—	
Bleached soda	130.00—	135.00
Bleached soda, Canadian	130.00—	135.00
Kraft, bleached hardwood	**135.00—**	**140.00**
Kraft, bleached	145.00—	150.00
Kraft, bleached Canadian	150.00—	
Kraft, unbleached southern	120.00—	
Kraft, unbleached, Far West	125.00—	
Kraft, unbleached Canadian eastern	135.00—	
Kraft, semi-bleached southern	130.00—	

Quotations on imported wood pulp dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite Swedish, freight allowed	140.00—	
Bleached sulfite, Norwegian, del'd with limited freight allowance	140.00—	
Bleached sulfite, Finnish, freight allowed	140.00—	
Unbleached sulfite, Swedish, freight allowed	125.00—	130.00
Unbleached sulfite, Finnish, freight allowed	125.00—	130.00
Kraft, unbleached, Swedish, freight allowed	125.00—	
Kraft, unbleached, Finnish, freight allowed	125.00—	
Kraft bleached Swedish freight allowed	150.00—	155.00
Kraft, bleached, Norwegian	150.00—	155.00

PAPER

Quotations are mill quotations Chicago

Book Paper (f.o.b. Chicago, c.l. skids per cwt):		
No. 1 enamels	20.80	
No. 2 enamels	19.80	
Machine-coated, 45- to 100-lb.	15.55—	19.00

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Knox Felts
KNOX WOOLEN COMPANY
CAMDEN, MAINE
America's First Manufacturer of Endless Paper Machine Felts

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WATERTOWN, N. Y.

Pensacola, Seattle
Montreal, Vancouver

For more data circle 145 on Post Card

NAMES IN THE NEWS

Continued from page 280

ect engineer at Green Bay, Wis.

Glenn A. Arendt was transferred from the company's central engineering department in Menasha, Wis. to take over the duties of maintenance engineering in Naheola's converting department.

Keith "Skip" Campbell has taken over the duties of electrical maintenance supervisor in the engineering department.

Taylor-Wharton Co.

Robert A. Herstine has been appointed to the sales staff of this company, a division of Harsco Corp. of High Bridge, N.J.

Conoflow Corp.

T. Jack Simpson has joined the R. Mack Goble Co., exclusive representative for Conoflow Corp. in Houston, Texas.

Clinton Corn Processing Co.

Everett E. Hanke has been appointed district sales manager for the New England states for this company of Clinton, Iowa. Hanke has been a member of Clinton's New England sales force since 1953, and his sales office will be in Somerville, Mass.

Institute of Paper Chemistry

Ronald Estridge has been awarded the Annual Westbrook Steele Gold Medal award, which is given annually to students of the graduate school at the Institute of Paper Chemistry, Appleton, Wis.

Huyck Felt Co.

Donald J. Guillet has been assigned duties as field service engineer for Arkansas, Louisiana, Texas and portions of Alabama, Mississippi and Oklahoma. In this capacity he will join felt sales engineer Clyde J. Pate to serve paper mills in the south and southwest.

Guillet

Turnbull

Bauer Bros. Co.

Douglas E. Turnbull has been named as a new sales representative for this company of Springfield, Ohio. He will cover the Ohio, Indiana, and Michigan area.

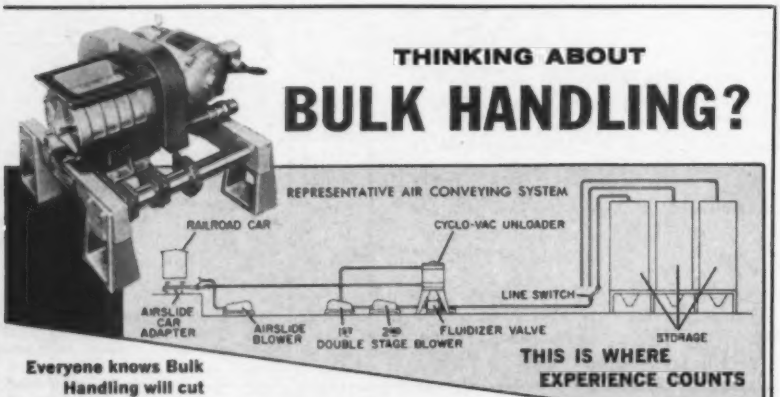
NECROLOGY

Reid O. Gruber

Reid O. Gruber, founder and longtime president of the Niagara Corrugated Container Co., died. Gruber founded the company in 1931, and served as president until 1946, when the firm was merged with General Container Co. of Cleveland. He served as vice president until his retirement in 1959.

J. Harold Londergan

J. Harold Londergan was former Executive Secretary of the National Paper Trade Assoc. Londergan joined the Association in 1934 and served as Director of the Statistical Research Division until 1951, when he assumed the secretarial position.



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For more data circle 146 on Post Card

INDEX TO ADVERTISERS

Albany Felt Company 241
Allied Chemical Corp., General Chemical Division
American Defibrator, Inc.
American Oil Company ..... 3rd Cover
American Potash & Chemical Corp. 261
American SF Products, Inc.
Anglo-American Clays Corporation
Anheuser-Busch, Inc.
Antara Chemicals 266
Appleton Wire Works, Inc. 244
Appleton Wood Products Co. 283
Archer Blower & Pipe Co., Inc. 278
Asten-Hill Mfg. Co.
Atlas Refinery, Inc.

Babcock & Wilcox Co., The, Tubular Products Div.
Bailey Meter Company
Barrett-Cravens Company
Bauer Bros. Co., The 220
Beloit Iron Works 231-232
Black-Clawson Company, The 262

Cameron Machine Company
Carthage Machine Co.
Celgar Limited
CIBA Company, Inc.
Classified Advertising 278, 279
Clinton Corn Processing Co. 224
Conoflow Corporation
Crane Packing Company
Curtiss-Wright Corporation

Dempster Brothers
De Zurik Corporation 222
Diamond Power Specialty Corp.
Dow Chemical Co.
Dow Corning Corporation 273
Draper Brothers Company 258
Du Bois Chemicals, Inc.
Dusenbery Company, Inc., John

Egan & Co., Frank W.

Fabri-Valve Company of America
Fairbanks, Morse & Company
Fibre Making Processes, Inc. 274
Fiske Brothers Refining Co., Lubriplate Div.
Fluidizer Division of Daffin Corp. 282
Foote Bros. Gear & Machine Corp.
Fritz Publications, Inc. 279

General Dyestuff Company
Georgia Kaolin Company ..... 4th Cover
Goslin-Birmingham Mfg. Co., Inc. 248
Great Lakes Carbon Corp., Dicalite Dept. 242

Hamblet Machine Co.
Hanchett Manufacturing Co. 279
Horton Manufacturing Company, Inc.
Hubinger Company, The
Humphrey Elevator Company 280
Huyck Felt Co. 221

Illinois Gear & Machine Co.
Improved Machinery, Inc. 265
Ingersoll-Rand 218-219

James Gear Mfg. Co., D. O.
Jamesbury Corp.
Jenkins Sons, Inc., M. W. 276
Johns-Manville 214
Johnson Corporation, The ..... 2nd Cover
Jones Corporation, E. D. 213

Kalamazoo Tank & Silo Co.
Kamyr, Inc.
Knox Woolen Company 281

Lamb-Grays Harbor Co., Inc.
Langston Co., Samuel M. 246
Layne & Bowler, Inc. 243
Lehmann Co., Inc., J. M.
Lindsay Wire Weaving Co., The
Link-Belt Company
Lodding Engineering Corp.
Lubriplate Div., Fiske Brothers Refining Co.

Marathon, Div. of American Can Co.
Moisture Register Co.
Moore & White Company
Mount Vernon Mills, Inc. 216
Mullis Eng. & Mfg. Co., Carl W.
Murray Mfg. Co., D. J.

National Perforating Corp.
National Safety Council 276
Naylor Pipe Company 275
Nichols Engineering & Research Corp. 252
Noble & Wood Machine Company 257
Norton Company

Orr Felt & Blanket Co.
Overly's Incorporated 273

Paper Converting Machine Company 250
Paper Industry, The 279
Parsons & Whittemore Inc.
Penick & Ford, Ltd., Inc.
Perkins & Son, Inc., B. F.
Photovolt Corporation 271
Poirier Control Company
Porter Company, Inc., H. K.
Portland Copper & Tank Works, Inc.

Charles P. Raymond Service, Inc.
Red-Ray Mfg. Co., Inc.
Reichhold Chemicals, Inc.
Riverside Alloy Metal Div., H. K. Porter Company, Inc.
Ross Engineering, J. O.
Ross Midwest Fulton Corp. 270

Sandy Hill Iron and Brass Works
Scapa Dryers, Inc.
Shuler & Benninghofen 255
Sinclair Company, The 283
Smidth & Co., F. L.
Sonoco Products Company 249
Spraying Systems Co. 279
Staley Mfg. Co., A. E. 245
Stebbins Engineering & Mfgr. Co. 282
Steinen Mfg. Co., Wm., Industrial Nozzle Div.
Stickle Steam Specialties Co.
Swenson Evaporator Company

Taylor-Wharton Co. 272
Tennessee Corporation
Texas Gulf Sulphur Co.
Textile Paper Products Inc. 260
Transall, Inc.

Union Asbestos & Rubber Co.

Valley Iron Works Corp.
Vanderbilt Co., R. T.
Van Products Co. 268
Vulcan Iron Works Inc.

Weyerhaeuser Co. 251
Whiting Corporation
Whitney Chain Company
Williams-Gray Company 279
Wisconsin Wire Works

END OF GRAIN MAPLE

SLOTTED SUCTION BOX COVER

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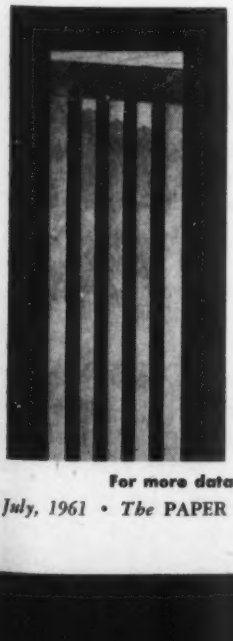
Tough, laminated plastic cross members support the end-of-grain maple lands and completely eliminate sag.



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WIRE LO-VAC SAVER

U.S. Patents No. 2,618,206 and 2,740,332
Can. Pat. No. 477,588

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APPLETON WOOD PRODUCTS CO.
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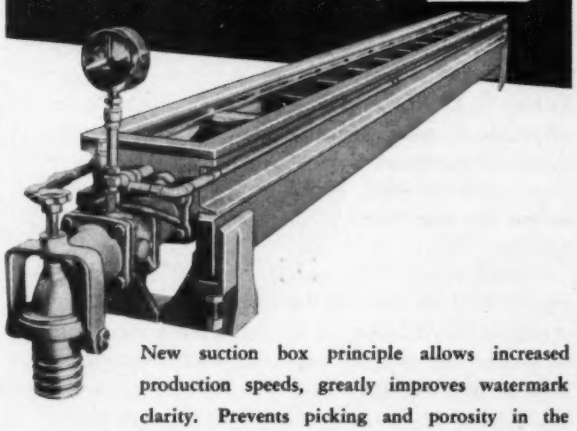
New Dandy Roll Suction Box Makes Good Watermarks BETTER



New suction box principle allows increased production speeds, greatly improves watermark clarity. Prevents picking and porosity in the making of thin and superfine papers. Better quality and finish assured. Write for descriptive literature.

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whither?

in production
processes
new products
markets

Export trends

Export of wood pulp during the first quarter of 1961 amounted to 307,000 tons, corresponding to a gain of 22 per cent over the same period in 1960; paper exports amounted to 90,000 tons, representing a gain of 16.7 per cent; and paperboard exports rose to 140,000 tons which is a gain of 33.2 per cent.

The established favorable trend for expanded U. S. pulp, paper, and paperboard exports is expected to continue through 1961 and the following years.

New heat source produces temperatures of 3000° to 6000°F

Temperatures of 3000° to 6000° F have been obtained from a new heat source developed by Arthur D. Little Inc. This heat source derives its efficiency from a combination of chemical and electrical energies, by superimposing the energy from a low-current, high-voltage a.c. discharge on the burning flame of an ordinary fuel-oxidant mixture.

It was found that adding electrical energy equal to 50 per cent of the energy obtained from chemical combustion at an optimum air-fuel ratio raises the specific enthalpy of the fuel from 1100 to 1600 Btu/lb.

A chemical to reactivate DDT

A chemical additive has been discovered by Dr. Moshe Neeman, Israel, which appears to reactivate DDT so that flies after 18 generations still remains susceptible to conventional dosage of additive-DDT combinations.

DDT alone no longer is very effective in insect control because some insects have the ability to develop dehydrochlorinase, an enzyme that converts DDT to the non-toxic dichlorodiphenylethane.

The additive, which bears the chemical name of N, N-di-N-butyl-p-chlorobenzenesulfonamide, has the property of preventing the conversion of DDT to dichlorophenylethane.

Denser paperboard for corrugated containers

The use of denser paperboard made of blends of softwood and hardwood pulp is a way of imparting greater strength and stiffness to corrugated containers, according to Keith Q. Kellicutt who is in charge of corrugated container research at the U. S. Forest Laboratory at Madison, Wis. Developmental research on multiwall corrugated containers is now underway that will make them suitable for carrying loads of many thousand pounds.

Chemical treatment of trees "on the stump"

New methods of treating trees "on the stump" are reported from the USSR with the view to obtaining such objectives as wood preservation, air-drying without warping or cracking, imparting fire-resistance, etc.

Thus, sodium dinitrophenolate used as a preservative also makes wood more combustible; antipyrene makes wood fire resistant; silica is reported to harden a tree to the extent that it can be sawed or chopped only with difficulty; and acetic acid imparts an orange color to birches and beeches.

Nicolet Paper coats aluminum on glassine

A high-speed aluminum coating process for glassine has been developed by Nicolet Paper Corp. Aluminum is evaporated from an electrically heated boat in a chamber evacuated to a pressure of approximately 1 micron. The aluminum vapor condenses on the glassine in a microthin coating of pure aluminum with a thickness of $3\frac{1}{2}$ millionth of an inch. The coated material is strong, grease-proof and odor-resistant and has already been used in the making of bags for ice cream bars.

Its importance is further envisaged for such packaging uses as candy bar wraps, potato chip bags, decorative box liners, for cookies and confection, labels, etc.

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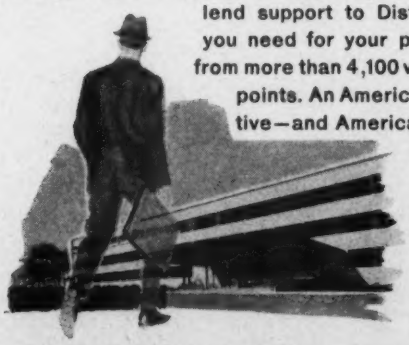

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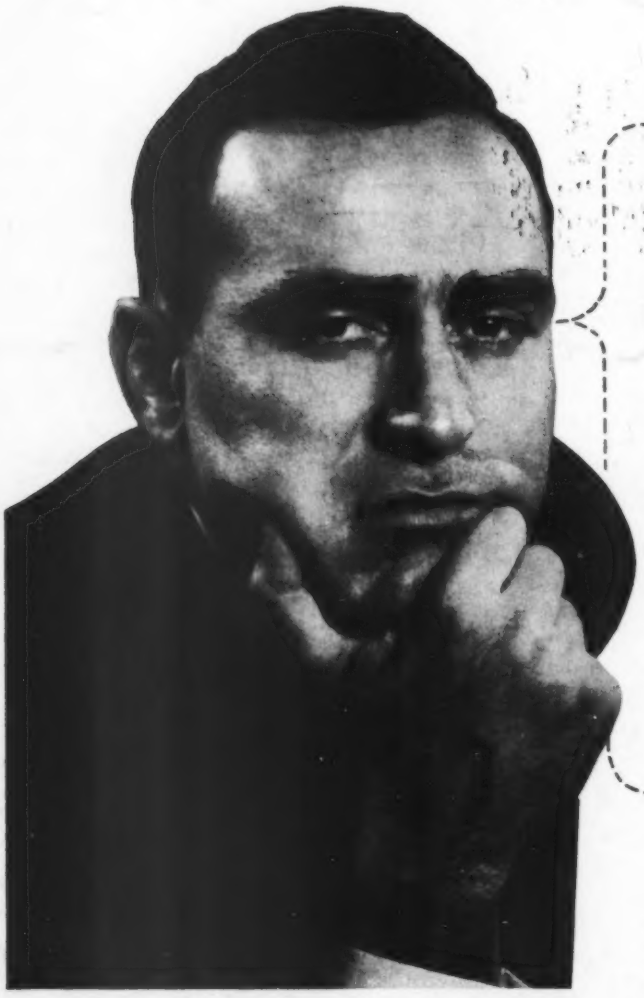
Thinking of coating or filling with clay?



Should we use a trailing blade... or an air knife?

Maybe it should be a roll coater... or a reverse roll?

What about a size press?

Double coating? Simultaneous or successive?

On or off the machine?

Wet or dry storage?

Fill at the secondary headbox?

Best place to furnish the clay?

There are plenty of tough decisions to make when it comes to coating or filling paper with clay. Using clay successfully involves a lot more than selecting a grade.

You'll find the Georgia Kaolin Company furnishes a lot more than just quality clay. The important extra is technical service. Georgia Kaolin has helped many companies, large and small, in solving problems of clay handling, clay make-down and coating-color formulation.

Georgia Kaolin technical assistance goes beyond ideas and opinions. The Sales Service Department operates pilot coating machines which can demonstrate the effects, on your own raw stock, of different formulations and various methods of coating. These facilities, plus Georgia Kaolin knowledge and skill, can be an all-important adjunct to your own research.

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